RECEIVED
1920

The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. II. FEBRUARY 28, 1920 No. 37

Contents

	PAGE
Editorial Notes: University Appeals; THE CHEMICAL AGE in Berlin; Organisation Problems; Industrial Chemists; Record Nitrate Prices; Mr. R. B. Pilcher	217
The Calendar	219
Chemists and Labour. D. IVOR JANIS and W. WARR ...	220
Training in Colloidal Chemistry. CATALPO, LTD.	221
Industries Fairs in London, Birmingham, and Glasgow ...	222
Mr. R. B. Pilcher's Institute Record	224
Status of the Chemist: Chemical Industry Club Paper... ...	225
Filtration and Softening of Water. Dr. GRANT HEPBURN ...	226
Catalysis. Dr. MAXTED	227
Remuneration of Chemists: Institute Return	228
Purchase of German Dyes	230
Chemical Matters in Parliament	231
From Week to Week	232
References to Current Literature...	233
Patent Literature	234
Market Report and Current Prices	237
Company News	239
Commercial Intelligence	240

Index to Advertisers, see page iii.

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- Abroad. Cheques, P.O.O.'s, and Postal Orders should be payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).

University Appeals

To the recent appeals for a more liberal endowment of university work in this country, two new ones must now be added—one on behalf of the Yorkshire University at Leeds, the other on behalf of the Armstrong College at Newcastle. The principle underlying the provincial university idea is well illustrated in each case—namely, as Matthew Arnold once put it, the need of taking the instruction to the student if the student is unable to go to the instruction. On this principle the Colleges at Leeds and Newcastle have been set up as the recognised local seats of learning. Each has a dense industrial community to serve, with the same two-sided problem to solve—on the one hand how, while standing uncompromisingly for the value of all true learning for its own sake, to make the arts and sciences of direct service to industry—that is, to the needs of mankind; and, on the other, how to awaken throughout industry a truer sense of the value of applied science especially to nearly every form of industrial enterprise.

It is the fashion in some quarters to-day to belittle the commercial value of the academician. It is true, of course, that all distinguished scholars are not pre-eminent for business qualities, but an equal proportion of the "practical" men also would probably be found to be commercial failures. It is a cheap and fallacious habit to disparage pure learning as something utterly ineffectual in life, and one not to be encouraged. The application of scientific principles to commercial uses does, indeed, require much of the commercial sense; but certainly not less important than their application is the discovery and mastery of the principles themselves. This is the work of the pure scientist, and to belittle it in order to exalt the office of the technician is to sap the very sources of progress. We need, of course, clever and resourceful minds to apply science in industry, but the success of the practical technician depends on what he has to apply, and unless pure science constantly enriches him with new supplies his work must degenerate into uncreative routine. Whether we call it technical or academic, all education means essentially liberal culture, and when it loses that element it loses its soul. It is because our universities stand for this ideal that they deserve united support.

In the case of Leeds, we understand that a public appeal is shortly to be issued. Its present financial difficulties are really the penalty of its own success, for as the advantages it offers become more and more appreciated so does the necessity for inceased staff and accommodation grow. Yorkshire is almost a nation in itself, and the university which serves the whole county is entitled from the whole county to the funds required to enable it properly to discharge its functions. It is on this principle that the present appeal is to proceed, and we hope the response will be worthy of the cause and of the county. The case of the Armstrong College is even more urgent. From a statement by Sir Theodore Morison, the principal, it appears that on its present financial basis the college has to face every year a recurring deficit of about £12,000. A running debt of this kind, apart from making extension impossible, has a depressing effect on its current activities, and this can only be lifted by the public bodies and private benefactors who have made their wealth out of local industries, largely based on chemical and engineering science, providing an adequate endowment fund. So serious is the position that the principal even talks of Newcastle ceasing to be a centre of higher education. One cannot believe that the energetic people of the North, once they know the facts and realise the position, will allow such a disaster to fall upon them; for a disaster it would be, not merely for the College, but for the whole community which it serves.

"The Chemical Age" in Berlin

A WELL-KNOWN consulting chemist who has just returned from Berlin, sends us an interesting note which illustrates how keenly German chemical firms are following movements in this country, and how alert they still are in chemical ideas and chemical practice. "During my stay in Berlin," he writes, "I came across a copy of THE CHEMICAL AGE in the directors' room of an important company which has devoted its attention very largely to the study of colloidal phenomena. The chairman, taking up your journal, pointed to the article by Mr. F. E. Weston, dealing with the application of colloidal clay to soap manufacture, and expressed surprise at the amount of public interest which it had excited. Taking me into the directors' laboratory, he pointed out that even now—considerably more than twelve months after the conclusion of the war—they were still compelled to employ soap, or so-called soap, consisting for the most part of colloidal clay, with a small addition of carbonate of soda and some binding material. One may safely say that for a long time past the bulk of Germany's washing has been done with various admixtures, the greater part of which consisted of clay. It is, perhaps, the varied experiences they have gone through during this period and their familiarity with this particular subject, that accounts for their surprise at the interest aroused in England by your article on the use of colloidal clay in soap-making."

"Another incident," he continues, "may interest your advertisers. During the interview the chairman of the company called my attention to the Cape Asbestos Co.'s advertisement of asbestos filter cloths, and asked me if I could procure for him, owing to the incidence of exchange and other difficulties, some foot-square samples which he thought might be very useful in view of certain experiments they proposed to carry out. I thought this might be interesting to you and to your readers as an example of the way in which advertisements find their way into the most distant and unlikely places."

Organisation Problems

No one could have listened to the discussion at the Chemical Industry Club on Monday evening on the status of the chemist without realising that the organisation of chemists is becoming an extremely "live" question. We have further evidence on the point in the brilliant letter we print this week from Mr. D. Ivor James, and in the valuable return of chemists' salaries published by the Institute of Chemistry. It must be confessed that when it comes to constructive proposals the discussion generally begins at a rather elementary stage. On Monday evening, for example, it was asked how, if one chemist left or were dismissed, his employer could be prevented from employing a cheaper successor; how the really qualified chemist could prevent firms from employing as works chemists people of very amateurish qualifications; whence, if there were a strike, the funds were to come for the support of the strikers; how it was possible to apply to such highly individual work as chemistry the principle of a minimum or standard wage; and so forth. All these points are naturally bound to arise. They are the elementary problems of organisation. Without discussing them in detail now, it is enough to point out that they have all been solved by the medical and the legal professions in their own way, and by the manual workers at the other end of the scale in a quite different, though not much less effective, way. They can, of course, all be solved by chemists equally well as soon as the whole body of working chemists bring their minds to the task. Of course, it will take time. Funds, membership, organisation, influence all begin to grow once the organisation that really meets the need is set up. The trouble for the moment is a certain confusion of mind as to aims and policy, and the more vigorously and frankly the points in doubt are discussed the more likely are we to reach an early and sound conclusion. That work is now proceeding briskly, and in due time, we have no doubt, a policy will be found which will safeguard the economic interests of working chemists, and at the same time bring real gain to chemical industry in general.

Industrial Chemists

THE report published last week of the annual meeting at Middlesbrough of the National Association of Industrial Chemists is a convincing record of steady progress in organisation. Clearly, the Association has the advantage of active and able minds within its membership, and it has—what is equally important—a perfectly clear view of its future policy and aims. Perhaps the central point in this policy is that, while frankly accepting the principle of trade unionism, it firmly adheres to what is known as the third party attitude. This does not involve, as Mr. Searle has pointed out, any hostility either to capital on the one side or to organised manual labour on the other; it merely claims that chemists are a distinctive class in industry and can best safeguard the interests which the Association was formed to promote by retaining their freedom to apply the trade union principle to their own special conditions in their own way. Whether ultimately those interests will be best served by an independent attitude (as Mr. Searle argues) or by a formal alliance with manual labour (as other correspondents argue) experience alone can decide. The general feeling of the intellectual or scientific class of workers will, we fancy, be with Mr. Searle; on the other hand some organisations of this class—for example, the National Union of Journalists—have frankly thrown in their lot with the Labour Party, and by combination of all the groups of workers in a particular industry have secured some rather striking results. These results, however, need not be accepted as conclusive. On a long view, it may be found that the wise policy is to recognise the essential differences which must always distinguish brain work from manual labour in the grouping of all the parties to industry.

Our own view of labour organisation has been that trade unions of any class will gain in the long run by broadening their outlook to include all sides of industry rather than by narrowing it to their own class interests. The cruder type of labour mind frequently makes two false assumptions. The first is that profit-producing industry must always exist, and that the sole business

of a trade union is to get as much of the profit for the worker as possible, and sometimes also to give as little as possible in return. The second is that manual labour is the great producer of wealth. As to the first, perhaps the simplest reply would be to invite such people to risk their own money in starting a new business for the production of profit. As to the second, one has only to examine into the parts which the engineer, the inventor, the chemist, the business manager, and the person who provides the initial capital play in building up great businesses to see how ill-founded such a view is. The educated worker of the "third party" class is able to see this one-sided character of the ordinary trade union outlook, and from his central position may be able to influence capital on the one side and the manual workers on the other towards a truly co-operative attitude. If such bodies as the National Association of Industrial Chemists, while properly safeguarding the economic interests of their members, use their influence for constructive purposes, and if the employing class welcome their advice and help in perfecting industrial conditions, nothing but good can be the result throughout industry generally. On such questions, for example, as the regulation of the admission of boys into the chemical profession and the most profitable courses of training for them the Association's work may be of the highest educational importance to chemical industry. It is the Association's interest in these larger problems which begets a confidence that on its present broad lines it may become not less than the ordinary trade union but very much more.

Record Nitrate Prices

WE drew attention some few weeks ago to the fact that conditions in the Chilean nitrate industry were undergoing steady improvement; but towards the close of last year everything pointed to a continuance of industrial unrest, and it seemed as if producers would be unable to take full advantage of what promised to be a record season. If, however, the present boom in nitrate shares may be taken as a criterion of the true state of the industry, an unprecedented season is now anticipated; and, for the moment at any rate, no thought is being given to the possible rivalry of fixed atmospheric nitrogen. The demand for nitrate now appears to be coming from all parts of the world, with America and Japan as the principal buyers, and in all quarters consumption is increasing at a prodigious rate. It will be remembered that in November last the Nitrate Producers Association raised the price to 10s. 6d. per quintal; but even now, before the full effect of Continental buying has been felt, the price is close on 18s. per quintal. The peak of the consumption will, no doubt, be felt in some two months time, and the optimists anticipate that the price will reach 25s. before the close of the season.

No wonder, then, that nitrate shares are appreciating, for one authority estimates that at 18s. per quintal the concerns with the best grade caliche and most efficient plant must be earning a profit of at least 8s. per quintal. Moreover, in pre-war days 2s. per quintal was thought to be quite a good profit, and half-a-crown meant bumper times. Those, however, who have any inclination to buy nitrate shares for a rise on present prospects would do well to remember that the market is a very fickle one, even when at its best; and the rises already registered are pretty substantial. For instance, to mention two favourites, Lagunas have appreciated 11 per cent. and Rosarios 20 per cent. within the last three weeks. The chief stumbling-block to the trade is the lack of shipping facilities, although the situation in this respect should gradually improve as food-ships are released.

Mr. R. B. Pilcher

OUR congratulations, which we know our readers will share, are offered to Mr. R. B. Pilcher, who this week completed his 25th year as Secretary of the Institute of Chemistry, and of whose excellent record of service for the profession some slight account is given on another page. We dare not bring a blush to Mr. Pilcher's cheek by telling the full story of his work or analysing the qualities of mind and character which explain its success—his tact and courtesy, his calm but effective energy, his gifts of foresight, faith and organisation, and allied with them all his personal devotion to the Institute, to the profession, and to all who practise it. It is enough to know that all these qualities are at their fullest to-day, and to express a hope that they may long continue unimpaired for the promotion of the good work to which Mr. Pilcher has given his life.

The Calendar

Mar.		
1	Royal Society of Arts: "Recent Researches in the Cellulose Industry. Third Lecture. Charles F. Cross. 8 p.m.	John Street, Adelphi, London, W.C.2
2	Manchester Municipal College of Technology (Dept. of Applied Chemistry): "Water Supplies—Their Filtration and Softening." Third Lecture. Dr. G. G. Hepburn. 4.30 p.m.	Manchester.
3	Society of Public Analysts: Papers by C. Ainsworth Mitchell, C. J. Ward and Raymond V. Wadsworth. 8 p.m.	Chemical Society, Burlington House, Piccadilly, London, W.1.
3	Society of Chemical Industry (Newcastle-on-Tyne Section): "The Heat of Carbonisation of Coal," G. Weyman; "A New Characteristic for Coal—the Agglutinating Curve," Capt. F. S. Sinnatt. 7.30 p.m.	Chemical Lecture Theatre, Armstrong College, Newcastle-on-Tyne.
4	Society of Dyers and Colourists (West Riding Section): "The Chroming of Wool." Dr. L. L. Lloyd	Bradford.
5	Royal College of Science Union (Chemical Society): "Catalysis." E. Dickinson.	Royal College of Science, South Kensington, London, W.
5	Society of Chemical Industry (Bristol & South Wales Section): "Importance of Cheap Power in Chemical Industry." Dr. C. M. Thompson. 7.30 p.m.	University College, Cathay's Park, Cardiff.
5	Society of Chemical Industry (Manchester Section): Papers by James Grant, Professor E. Knecht and B. R. Bostock. 7 p.m.	Grand Hotel, Manchester.
6	Society of Chemical Industry (Newcastle-on-Tyne Section): Visit to Works of the International Paint & Composition Co., Ltd. 2.30 p.m.	

Chemists and Labour

To the Editor of THE CHEMICAL AGE

SIR,—Chemists who have the best interests of their profession at heart regard with suspicion the projected *rapprochement* between the National Union of Scientific Workers and the British Association of Chemists on the one side, and the Labour Party on the other. Frankly, we distrust the Labour Party; its fully-grown appendages—the Trades Union Congress, the Internationale, and the Independent Labour Party—are so interconnected that the line of demarcation is difficult to distinguish and oftentimes one does not know whether it is the head or the tail which is wagging. Who precisely represents the Labour Party appears to be indeterminate, and apart from the political section there appear no official pronouncements, but by elimination from the multitude of voices heard its aim purports to be the provision of an elysium for all except employers of labour. Originally this new heaven was designed to appeal to the manual worker, but as the movement has grown and "Labour has come into its own"—as many think into much of other people's own—its apostles have recognised the desirability of enlisting the active sympathy of the intellectual forces of the nation, *alias* the professional man. Consequently, an enthusiastic welcome is extended to chemists by six gentlemen, who claim in some measure to represent organised Labour in the columns of THE CHEMICAL AGE of February 7.

The joint meeting convened on February 7 to consider this *rapprochement* had for its chairman Mr. G. D. Cole. From the professional point of view the choice could be termed almost providential, for it is the expressed published opinion of this gentleman that anyone who attempts to render honest work for his wages is in the position of a man who assists another to commit a felony! Presumably the Labour Party would not have selected as chairman of a meeting convened by itself a person with whose views it fundamentally disagreed, neither can Mr. Cole's words be explained away as irresponsible *obiter dicta*. So now we understand! Beneath the suave cordiality of Mr. Clynes and Mr. Henderson lie the principles of Mr. Cole. An employer, *ipso facto*, is to be accounted as committing a felony for he is a private owner; private ownership is the communistic cardinal sin, and Mr. Cole's creed appears to be undiluted communism.

It is inconceivable that professional men would wish to be identified with a programme that is calculated to engender between employer and employees mutual suspicion and antagonism in place of mutual understanding. The chemical industry, as all others, depends upon an equitable sense of contract and obligation. Personal honour demands that one should render a just service for remuneration received, and trained chemical men wish to see neither their professional honour called in question, nor their industry at the mercy of vacillating opportunism. With such principles the National Labour Party may cajole perhaps the doctrinaire, but it will not secure the intellectuals, charm it never so sweetly.

We have remarked that the Labour Party seems interwoven with the Trades Union Congress. Should chemists as a body elect to join the former, they inevitably will be enmeshed in the latter, dominated by the Triple Alliance of miners, railwaymen and engineers exercising a block vote; and although Mr. Henderson states that "the objectives of Labour are not and never have been to serve the interests of one class" (THE CHEMICAL AGE, February 7), yet the practice of the Congress would appear to suggest a policy of *chacun pour soi*, with occasionally perhaps *le bon Dieu pour tous*, but with regard to the unfortunate minority in which chemists would find themselves—*a la lanterne!* It is true that the Congress does not dictate directly the rules of the various unions, but it is easy to understand that by peaceful picketing and persuasion, with a judicious admixture of *force majeure*, the smaller components might find it convenient—and possibly necessary—to conform to the policy adopted by their more affluent and influential brethren.

This policy is framed to secure an intense specialisation in industry that is altogether artificial, and is based upon the theory that practical knowledge can be divided into isolated independent compartments—the more the better—and no man may dare, on peril of major excommunication, to venture beyond the dogmatic line his union has drawn in the matter either of ways, hours, or scope of his work. Such a theory might be tenable were a workman merely a machine, but unfortunately he is subject to the same human frailties as other folk, and can readily be influenced by such considerations as a "ca'-canny" policy, or the natural wish not to deprive another man of his job. Thus, to take an example at random, the repair of an electrically-driven fan, the electrician must be there to advise or to investigate, a fitter and his mate must attach the bolts, and a bricklayer, also mated, will think concerning cement. The respective unions approve of the matter, but the process enormously increases cost of production and consequently also the price of living.

Whatever the avowed purpose of such restrictions may be, the practical results, as almost every employer is experiencing, include diminished output, loss in efficiency, and a lack of interest on the part of the management in the personnel of its staff.

With the chemical profession directed by labourites there seems no reason why the misfortune of the foregoing restrictions should not also befall us. The organic chemist would have to cease thinking inorganically; the analyst would not soar researchwise; the professor would surrender his consulting practice, and the lecturer his private tuition; Carius tubes would be the perquisite of the glassworker's union; to tighten or loosen the bolts of an autoclave an engineer—in common parlance, a fitter—would be present, accompanied by his invariable shadow, the mate, bearing a spanner; electro-analysis or electro-reduction would necessitate an electrician—of what variety we do not know, but certainly he would have to be there; and if by chance the unfortunate chemist happened to wash his apparatus, the laboratory steward would complain to the bottlewasher's union, and monsieur would be reprimanded with an intimation that the incident was anathema and must not occur again. The position would be ridiculous, but the ridicule would be just. Perhaps the lot of routine laboratory testers might become more remunerative if they enlisted in the ranks of official Labour, but we do not propose such persons should be accounted "professional men," at least not until they had acquired such qualifications as might be deemed requisite, in which case they would almost certainly cease to be routine testers, and would become eligible for superior appointments.

Naturally we wish to safeguard our interests, but this we should do for ourselves, and not procure others to do it for us. The latter process would involve the inevitable *quid pro quo*; it might develop into selling to the highest bidder, and as "Labour" is not exactly a philanthropic institution, purchasers would buy what goods we might have to offer only by reason of any advantage accruing to themselves. Security lies in the formation of a non-examining body of our own, framed somewhat on the lines of the British Medical Association or the Law Society, which will admit into membership only those who have duly qualified by negotiating the necessary examinations. If co-operation be required, it should be with men of our own status, with other professional bodies; if pressure is to be exerted, let it be exercised from within, not from without. The last misfortune we should wish is the possibility of being made tributary to that coercion to which the Labour Party undoubtedly subjects its members, be they so obstinate as to refuse plausible argument, or so contumacious as to resent dictation. A *rapprochement* with Labour, as at present constituted, is a thing to be eschewed; it is ill-advised, inexpedient, impolitic, for East is East, and West is West, and although there need be no antagonism, under present conditions the twain can never meet.

In the meantime, the Labour Party, instead of spreading nets to trap the unwary, might do many things worse than pondering over these recent logical words of Mr. Trotsky—"The freedom of labour is only a capitalist institution, and cannot be admitted in a communistic State."—Yours, &c.,

18, Powis Square, Bayswater, W.11. D. IVOR JAMES.
February 23.

To the Editor of THE CHEMICAL AGE.

SIR,—It is not that I am anxious to have the last word, but please allow me to reply to Mr. Searle's letter in your issue of THE CHEMICAL AGE, February 14, p. 195.

To my question, (*c*) "Are there not sufficient chemists outside the unions to carry on?" Mr. Searle replies "Yes." Now, this is the point of my questions. So what is the use of a union that the

employers can snap their fingers at? As to the difference in opinion between myself and the chemists' associations, Mr. Searle says "Time alone will prove which is correct." But we cannot wait for time. Time will not wait for us. The chemists who are still on pre-war wages and those living on wages below the poverty line—which Sir Leo Chiozza Money puts at £5 3s. a week—cannot afford to wait. If they are to be induced to join the unions, they will want to see something in the shape of joining up in a powerful federation, and I know none so powerful as labour. The colliers, railway workers and labour can hold up industry, and must therefore be listened to. The word "clerical" was not a "misprint" for "chemical."

In THE CHEMICAL AGE, February 7, p. 143, Dr. Rodd says: "The new federation proposes to embrace a number of numerically very strong clerical unions, any one of which far outnumbers the combined scientific and technical organisations." I took this to mean the clerks of solicitors, bankers, accountants, auditors and stock-brokers, and, as I could not see how such a federation would benefit the brain workers of the industries, I asked the question. I, however, expressed a strong opinion as regards the strength of the chemists' union, and I am not alone in that opinion. The labourer gets an increase of wages as the cost of living increases, and also is able to claim any arrears since the last settlement. The "aristocrats of labour," the chemists, &c., get no such increases, and many are still on pre-war wages. The reason is that they are not combined, and, worse, are not federated. It may not be looked on as "gentlemanly" for a brain-worker to join or federate with a labourers' union, but it will have to come.

Mr. Searle says: "There is no suggestion on the part of chemists that there is any quarrel either with capital or labour." Then why form unions? Surely there are quite enough scientific societies, with their regularly published journals in which subjects are freely discussed. I take it that the unions are for obtaining that which cannot be secured individually, and, further, are to make an attempt to convince the capitalist that in ignoring the scientific worker he is missing much that he is unaware of. For instance, he has accountants and auditors to watch that every penny is accounted for, but where is the auditor to see that full value is got for his expenditure, say, in coal, material and labour, without, of course, trying to stint the wages of the latter? As regards "leaders from the ranks," it is certain that such must be better than those pitchforked into positions without the necessary training, which can only come by the "doing of it." Mr. Searle mentions the trinity—capital, labour and the third group. The world has to thank the third group for many of its blessings. It gave us cheap butter (margarine) for our bread, and now, by supplying nitrogen in plenty, will give us cheap bread for our butter. It is the third group that lightens the load of labour, that fills the coffers of the capitalist, and at the same time earns for itself crowns of glory. Unfortunately, these crowns are not accepted over the counters of the banks as current coin of the realm.—Yours, &c.,

Moorgate, Stalybridge, Feb. 25. W. WARR.

Training in Colloidal Chemistry

To the Editor of THE CHEMICAL AGE

SIR,—We are glad of the opportunity of replying to Dr. Willows' letter for two reasons—firstly, because he is an eminent physicist; and, secondly, because the importance of colloidal chemistry to the welfare of the country in the future is not yet grasped by the public. It does not need ourselves to tell Dr. Willows that there are hardly a handful of colloidal chemists in the country worthy of the name as yet. Every branch of our industries is likely in the future to depend for its existence on our knowledge, as compared with the knowledge of colloidal chemists of other nations, and yet an absolutely insignificant sum is being collected with difficulty to endow a chair for colloidal chemistry in the University of Manchester.

In our opinion, it is not a chair in any particular University, whether it is in London, Manchester, Oxford or Cambridge, that is required, but a national training institution, independent of charity and with no axe of any sort to grind except to educate the students in a branch of science of paramount importance. An institution should be established in the chief centres to enable students of means—and modest means—to obtain the requisite training, and the scheme, if properly organised and, above all, properly co-ordinated, might even become self-supporting in a short period of time.

This is a matter which really ought to be taken in hand by the Government if they were able to without making a hash of it. Unfortunately we fear the country will only see this when it is too late—*si monumentum quaeris circumspice*. From Manchester's point of view alone there must be at least a dozen millionaires in the district who ought to be only honoured to be allowed to subscribe to such a project as that of the Manchester University. They will no doubt see the result of their negligence later on when colloidal chemists from other countries will have deprived them of some of their trade. It is, however, no use lamenting the situation; we must see what can be done.

Will Dr. Willows help in collecting for a national institution, and we will promise such help as we can afford by subscribing ourselves and taking round the hat. Perhaps as the leading colloidal chemists are personal friends of his they will do likewise, and thus render our country a real service.—Yours, &c.,

19-20, Holborn Viaduct, E.C.1. CATALPO, LTD.
W. W. PLOWMAN.
(Catalpo, Ltd.)

The Chemistry of Lubrication

Paper by Mr. Archbutt

THE question as to the relation between the chemical character and the lubricating power of oils, which has recently attained such prominence, was again the subject of a Paper, by Mr. Archbutt, at a joint meeting of the Nottingham Section of the Society of Chemical Industry and the Derby Society of Engineers. The lecturer, a member of the Committee on Lubrication of the Department of Scientific and Technical Research, gave a clear account of the results obtained by that Committee and published in the memoranda on "Cutting Compounds and Diseases caused by such," and on "Solid Lubricants." He referred also to the conference of the Physical Society last November and to the theoretical views of Hardy and Langmuir.

Film and Contact Lubrication

It was necessary to make a clear distinction, he said, between "film" lubrication in which the surfaces were completely separated by a film of liquid, and contact lubrication which relieved the friction between surfaces which were in actual contact. The first kind was aimed at and usually attained in cylindrical and thrust bearings moving with high velocities. The latter kind occurred in bearings moving with low velocities and often under high pressures. In the case of film lubrication it was the viscosity of the oil which was of importance. A well-marked difference was found between mineral oils and animal and vegetable (glyceride) oils. While with the latter class perfect steadiness of running was maintained at the highest temperatures investigated, *i.e.*, 75° (in the case of castor oil 100°), with the former unsteadiness appeared at a critical temperature which varied for different oils but was well below 75°C.

In the other kind of lubrication, that between two surfaces in actual contact, an entirely different property of oils came into consideration. This property had been called "oiliness" in default of more exact knowledge as to its nature. It was measured by the machine of Deeley which determined the friction between metallic studs and a metallic surface covered with oil. The friction was much less with fatty than with mineral oils. "Oiliness" was explained by the existence of a surface film of almost molecular thinness (about 1 $\mu\mu$), the resistance of which to sheering stress was much less than that of clean metal surfaces.

These films were probably due to chemical attractions between the molecules of the liquid and those of the solid surface, which, according to Langmuir, and in agreement with the results of X-ray analysis of crystals, consisted of an atomic or molecular network under the influences of surface forces which rendered it more active than the interior. The work of Hardy had shown how greatly this kind of lubrication varied with the nature both of solid and of liquid. This variation was also seen in lubrication of machinery, and most strikingly by the great increase in oiliness obtained by adding small quantities of fatty acids (about 1 per cent.) to mineral oils which, when so treated, were equal to or better than the best vegetable oils.

Western Counties and General Manure Co

ON Friday, February 20, in the Court of Appeal, the Master of the Rolls and Lords Justices Warrington and Younger dismissed the appeal of the defendants in the action by General Sir H. Pole Carew against the Western Counties & General Manure Co., Ltd., from a judgment of Mr. Justice Sargant in the Chancery Division, holding that certain portions of sulphuric acid plant, which had been set up by the defendants for making of the acid as an ingredient for manufacture of manure and which had been erected upon land demised to defendants by the plaintiff at Torpoint, Cornwall, and which, just before the expiration of the lease, had been destroyed or greatly damaged by a destructive fire which occurred on the premises, were landlord's fixtures and not tenant's fixtures. The case for the appellants was that portions of the plant destroyed or damaged were in the circumstances tenant's fixtures, and that they were entitled to the insurance money thereon.

The Court held that certain acid chambers and towers and two sheds were, having regard to their construction, landlord's fixtures, and that the decision of Mr. Justice Sargant was right.

Industries Fairs in London, Birmingham, and Glasgow

Special Notes by Our Own Correspondents

THREE British Industries Fairs, organised by the Overseas Department of the Board of Trade, were opened on Monday in London, Birmingham and Glasgow, the chemical exhibits being allocated to the last. We give below some notes on the exhibits from our own correspondents :—

London

The Crystal Palace Show contains little, if anything, of immediate interest to the industrial chemist. The predominant feature is the display of toys and fancy goods, which occupies quite a large part of the space available. The industries are grouped and catalogued alphabetically in the following order :—Toys, games and sports goods ; musical instruments and furniture ; pottery and glass ; drugs and druggists' sundries ; scientific instruments, optical goods and spectacle ware, photographic and cinematograph apparatus and requisites ; stationery and printing ; jewellery, cutlery, silver and electro plate ; fancy goods ; and hand haberdashery, brushes, leather for fancy goods, bookbinding and upholstery trades.

The numerous stands on which glass of all kinds is exhibited testify to the enormous strides made in this country as a result of the cutting off of our foreign supplies due to the war. The exhibits cover a very wide range of articles, including laboratory utensils of all kinds, and domestic goods, such as dishes, lamp shades, drinking vessels, bottles, jars, &c. As an illustration of the wide field covered, the articles exhibited by a few of the firms represented may be mentioned. Messrs. J. Moncrieff, Ltd., of Perth, have a great display of beakers, flasks, mercury reservoirs, levelling bottles, jars and a host of specially shaped tubes for laboratory use, gauge glasses and cutters, protective glasses, lubricators of all shapes and miners' lamp glasses. Surgical instruments, in the manufacture of which glass is largely used, provide a great deal of interest. The General Surgical Co. manufacture an extended list of all-glass syringes, condenser tubes, specific gravity bottles and chemical thermometers, while the stands of Messrs. R. Johnston & Co., Duroglass, Ltd., The Scientific Glass Co. and a number of others contain many interesting features.

Connected with scientific instruments may be mentioned the display of scientific porcelain goods. These include a variety of basins, combustion boats, funnels, filter discs, troughs, pyrometer tubes, crucibles, &c., which can be seen on the stands of Messrs. Doulton & Co., The Worcester Royal Porcelain Co., Messrs. Geo. Church & Co. and C. T. Maling & Sons.

Of special interest is the specimen of glass wool exhibited by the British Glass Wool Co., of London. This is manufactured for chemical purposes, and the glass fibre is used in the making of commutator cleaners, brushes, polishers, ink erasers, &c. The product is manufactured from soda glass, and is free from lead and borax. Hitherto its manufacture has been solely in the hands of the Germans and Austrians.

A great variety of optical and spectacle lenses and prisms, lens measuring and testing appliances are to be seen. Among the firms represented are Messrs. Barr & Stroud, George Culver, Ltd., J. H. Dallmeyer, Ltd., The London Prism Co., the Sherwood Optical Co., &c. Messrs. George Culver, Ltd., show a specimen of a new model of the Sutcliffe-Micro-Keratometer, and a number of periscopes, binoculars, compasses, photographic and kinematograph apparatus, &c., are to be seen on the various stands.

There are a few exhibits of fine chemicals for photographic, medical and other purposes, among which may be mentioned Messrs. Burroughs, Wellcome & Co., The General Chemical & Pharmaceutical Co., Hall, Thompson & Co., and Johnson & Sons. The exhibit of the latter firm is concerned with photographic and kinematograph developing agents, and X-ray chemicals. Messrs. Stafford, Allen & Sons have specimens of a number of distilled essential oils and pharmaceutical preparations.

Other articles of interest include toilet soaps ; paper of all kinds, waxed or oiled, for the protection of perishable goods from atmospheric effects ; laboratory furniture, &c. In connection with the latter, Messrs. Baird & Tatlock have on view a number of benches, the primary object of which is to economise space. The London Filter & Pump Co., Messrs. W. R. Balston, Ltd., and a number of other firms exhibit specimens of filters, pumps and filter papers of all descriptions. There are also a number of X-ray apparatus for hospital and scientific purposes, as well as a large variety of accessories.

Reception of Delegates

By the invitation of Sir Alfred Mond a large company of foreign visitors to the British Industries Fair were entertained at Olympia on Wednesday evening. The guests were received by Sir Auckland Geddes (President of the Board of Trade) and were shown over the Ideal Home Exhibition.

Birmingham

THE Lord Mayor of Birmingham (Ald. W. A. Cadbury) formally opened the Birmingham Section of the British Industries Fair. It is situated at Castle Bromwich, close to the railway station (M.R.), about 5 miles from the centre of Birmingham. The Fair is housed in three huge aerodromes which afford 150,000 square feet of space, and there are 700 stands. All the groups are here, with the exception of the display by the gun trade which is at the City Art Gallery, close to the Town Hall, utilised during the Fair as a Reception Centre. There interpreters are in attendance to guide and inform overseas buyers. The catalogues are printed in English, French and Spanish.

The stands of the paint and enamel firms are in themselves a fine advertisement of their products ; they are in artistic colours, the door and panel surfaces being like pieces of highly-polished marble. About a score of firms of standing are represented, and what will impress the visitor about the section is the improvement effected in the methods of applying paints and varnishes on big scale lines. Spraying has become a general vogue, and now one notices the introduction of a "flowing-on" process which, although not exactly new, in the sense that it has been in vogue by a large motor firm for some time, is of considerable general trade interest. This process is illustrated by a model on the stand of Gittings, Hill & Boothby, Ltd., of Birmingham. In the ordinary way, by the old process of brushing, it takes a man about 2¼ hours to varnish an ordinary motor body, but under the "flowing-on" system the work is done in a few minutes. This firm also shows some excellent effects in stoving white enamel on a hospital table ; aeroplane varnishes on propellers, and art metal half-gloss finishes on motor lamps.

Celluloid spraying is a good feature of the stand of the Frederick Crane Chemical Company. The effect of spraying gilding materials is interesting as it shows the great possibilities of development in the fancy goods trades producing ash trays, cigarette cases, picture mouldings and the like. The spraying is machine done under a slightly heated temperature, up to 150°. Some good results are given with lacquers on electric bulbs—by frosting for obtaining subdued effects, and by colour and brilliancy for use in theatres and the like.

Choice samples of decorators' work in white are to be seen on the stand of Postans & Morley Brothers, together with examples of the judicious use of art green for outside work, finished with elastic copal varnish.

A wide general range of specimens of the trade is shown by Pinchin, Johnson & Co., London. The gloss satinette enamel features of the stand, picturesque in design, command attention. The Minerva effects are really brilliant, and for a superior subdued tone the egg-shell finish in bronze on weighing machines, &c., is entitled to a high place.

Some distinctive white enamels are exhibited by the Sunlight Enamel & Paint Co., and lagoline anti-corrosive paints, with a gloss finish make an appeal because in many industrial districts protective care has to be taken against the acid-laden atmosphere.

The stand of Lewis Berger & Sons, London, consists of four rooms in miniature—a futurist drawing room in yellow, black and mauve ; a jacobean hall in light brown ; a dining room in blue ; and a nursery in pale blue, with suitable freize. There is a very bold display here of dry colours, such as bronze blues, geranium lakes and crimson vermilion, and a semi-paste known as Master Painters' Paint—a substitute for white lead paints. It contains white lead plus a percentage of zinc and provides the decorator with a material for thinning to suit the varying surfaces on which he may be engaged.

A variety of lacquers for industrial purposes is exhibited by the Damard Company, Birmingham.

Carrs (Birmingham), Ltd., make a feature of enamels which are largely used in the bedstead and kindred trades, and a variety of quick stoving enamels and hygienic polishing enamels.

Arthur Holden & Sons, Birmingham, give practical illustration of high-class finish obtainable with stoving and air-drying varnishes. The effects of the application of brushing, dipping and spraying are clearly shown on a lot of ordinary domestic articles of kitchen use, and the fruit acid resistant qualities of Zinnatine is emphasised. Brilliant copal results on tin printing work arrest attention.

Charles H. Betts & Co. show examples of non-oxydizable gold enamels and a collection of bronzing liquids and metallic paints. For ornate work, too, the qualities of Metal Powders, Ltd., in gold bronze and aluminium are distinctive. There is richness and sheen ; the exhibition also has a general interest in that it shows that Germany's former practical monopoly in this class of material has gone.

Other exhibits include enamels chiefly for domestic use by Nicholsons (Newcastle-on-Tyne) ; Edgar Vaughan & Company's protective paints for iron and steel structures ; many industrial compounds, with decorative finishes, by Thomas Howse, Ltd.,

Smethwick; and Cuirass paints, having the appearance of enamel, for engineering and kindred work. These are claimed to be resistant to acids and inert to electrolytic action.

Balcon & Samuels, Birmingham, are featuring bronze and aluminium enamels which are quick drying (no stoving required), and are claimed to be acid resistant.

There are many smaller exhibits, all having an importance of their own, and in the oil section considerable attention is paid to the enormously increasing requirements of the motor and motor-cycle trade, machine tools and general factory needs. The Gargoyle Mobiloils are shown by the Vacuum Oil Company; the County Chemical Company displays a big collection of lubricants and lighting oils; Arthur Lamb & Son, Halifax, make a feature of lubrications, cutting compounds, and decarbonising solutions; the Elephant Chemical Company exhibit rubber solutions, burning and lubricating oils and brazing flux; and a collection of bituminous paint and metal cutting lubricants is shown by the Bretts Oil Company.

Other exhibitors in the section include the Aerograph Co., London, with spraying equipments; motor spirits and vaporising oils by the Anglo-Mexican Petroleum Co.; lubricators by Partridges, Ltd.; motor oils and gear lubricants by W. W. & R. Blackwell, Aston; and graphites for packings and lubricating by the Graphite Products, Ltd.

Glasgow

GREAT success is attending the British Industries Fair, which is being held in the Kelvin Hall of Industries, Glasgow. As in the Glasgow Fairs previously held the chemical trade is well represented, but the number of firms exhibiting appears to be not quite so large as on the occasion of the last local Fair. Among the members of the Exhibitors' Advisory Committee are Mr. W. D. A. Bost (Cartvale Chemical Works); Mr. J. Bruce (British Dyes, Ltd.); Mr. James C. Barr (James C. Barr, Ltd.); and Councillor Andrew McDonald (John Poynter, Son & McDonalds).

James Ross & Co. (Falkirk) show the various products of the Lime Wharf Chemical Works, including refined coal tar, crude naphtha, light oil, disinfectants, oil, creosote oil, coal-tar pitch, solvent naphtha and soluble creosols, together with ammoniacal liquor (25 per cent.), concentrated ammonia liquor, sulphate of ammonia, chloride of ammonia and carbonate of ammonia.

Brunner, Mond & Co. (Northwich) exhibit pure alkali, pure bicarbonate of soda, pure soda crystals, pure caustic soda, calcium chloride, muriate of ammonia, carbonate of ammonia and sulphate of ammonia. These chemicals are well displayed and show the specialities of the Northwich firm to advantage.

Brotherton & Co. (Leeds) claim in the official catalogue to be the largest concern in the United Kingdom engaged in the manufacture of ammonia and tar products, and their stand covers all their specialities from coal tar to dyes. Here are shown metachrome colours for the production of the large range of fast shades on wool; acid colours suitable for dyeing wool, silk, jute, paper and leather; direct colours for cotton, paper, &c.; oil soluble colours for oils, fats and waxes; carbonate and chloride of ammonia; and sulphuric acid, oleum and nitric acid.

Perry & Hope (Nitshill) have an interesting exhibit comprising phosphoric acid, pure and technical, cream of tartar substitutes, phosphate of ammonia, acid phosphate of soda, pyro phosphate of soda, calcium acid phosphate, phosphate of soda, malt extract, together with other articles for which the Forth and Clyde Chemical Works are noted.

W. B. Rodger (Glasgow) has an exhibit comprising specialities of Hertz & Co., such as liquid paraffin, petroleum jelly, brilliantine oils, haliflor essences, florizon disinfecting essence, cod liver oil, emulsion and malt and oil. Here also are displayed essential and terpeneless oils of lemon, orange, bay, limes, bergamot, cinnamon, &c., as produced by Hollands' Distillery (Southwark); while the high-class soaps, perfumery and toilet preparations of Piesse & Lubin, Ltd., are also shown.

The Liverpool Borax Co. (Liverpool) show clarisol borate as used by the textile trades, and this the firm claims to be a unique detergent. This firm exhibited with great success at the last two Glasgow Fairs and their display is likely still further to enhance their reputation in Scotland.

John Poynter, Son & McDonalds (Glasgow) show their well-known makes of animal and bone charcoal for sugar refining; and other specialities such as phosphoric acid, cream of tartar, sulphate of ammonia, sulphate of carbon, chloride of sulphur, carbonate of ammonia, prussiate of soda, sulphate of zinc, &c. This firm do a large business in acids and chemicals of all descriptions for export, and in addition to their Glasgow headquarters there are also branches at Greenock, Dumfries and London.

James C. Barr (Glasgow) have a wide range of sundry chemicals and colours for various industries—including stearates for waterproofing, puritol for the purification of acetylene gas for welding and lighting; and by-products from radium extraction such as radium fertiliser, luminous compound, percolators, pads, &c. Oil black is also featured.

R. & J. Garroway (Glasgow) show acids sulphuric, nitric, hydrochloric and sulphurous (of all grades), pure brimstone acid, bisulphite of soda (liquid of powder); all classes of chemicals for textile, bleaching, and paper-making; and superphosphates and compound manures. Among the other lines displayed are epsom salts, glauber salts and salt cake, together with potash salts, kainit, &c.

The Cartvale Chemical Co. (Paisley) exhibit wood distillation products and ultra-marine blue; flake charcoal for cold storage, insulation and special chemical purposes; acetate of lime for the manufacture of acetone, acetic acid, &c.; acetic acid for calico printers, and white lead manufacturers; pyrolignite of iron and acetate of alumina for dyers; and miscible wood naphtha for methylated spirit manufacturers.

Among the other exhibitors are a number connected with the dye ware trade, such as the British Dye Stuffs Corporation (Huddersfield), the United Kingdom Chemical Co. (London), Robert Young & Co. (Glasgow), the London Dye Manufacturing Co. (London) and Fairy Dyes (Glasgow).

Profit Sharing in Three Dimensions

Ways and Means, of February 21, contains an article entitled "Profit-Sharing in Three Dimensions," which outlines a scheme of profit-sharing adopted by the Whitefriars Glassworks, in which Management, as well as Capital and Labour, participates. Out of the net profits of the company the directors pay a dividend at the rate of 7 per cent. on the preference shares and 10 per cent. on the ordinary. After this deduction the balance of net profits is distributed, 10 per cent. to the reserve, 30 per cent. to Capital, 30 per cent. to Management, and 30 per cent. to Labour. The first of these three equal parts is distributed by way of a further dividend on the preference and ordinary shares. The second is distributed rateably among the persons who have been responsible for the management of the business of the company during the year. These include the directors, the managing director, the general manager, the managers of departments, and others who come within that category. The amount is apportioned according to the sums which each has received in fees or salary. Th third equal part is distributed among all other persons in the employment of the company during the year in question. Here, again, the principle on which the amounts are apportioned among individuals is that of the salary or wages which each has received. The effect is that Labour gets its weekly wage (at the recognised district scale rate of the unions involved), Management gets its monthly salary, Capital its yearly or half-yearly dividend, and after this has all been paid the residue of profit is distributed in the above proportion. The chief points to be noted in the scheme are, it is stated, in the first place, that the factor of brains is definitely brought into the reckoning; secondly, that the shareholders forego 60 per cent. of the surplus profits which otherwise they would retain; and, thirdly, that no condition is attached to the bonus to the staff except, to quote the articles of association, "that no such persons shall be entitled to participate in any such distribution who at the date thereof have been dismissed from the service of the company on the ground of misconduct." Thus even the casual labourer who had only worked one day with the firm during the year in question is entitled, if he could be traced, to his share in the bonus.

Professional Workers Conference

WE have received a note on the inaugural meeting of professional associations for the formation of a federation held at Essex Hall, London, Saturday, February 7. From this it appears that Mr. Cole (the chairman) stated that the committee in sending out invitations to professional associations was guided by the view that common thinking between manual workers and professional workers was essential. The difficulty up to the present had been that the manual workers did not appreciate the importance of the professional worker, and the latter exhibited a certain aloofness, not to say snobbishness, towards the manual worker. Of the associations invited some were already definitely allied to the Labour Movement and the Trades Union Congress, others were opposed to any alliance either with Capital or Labour, and favoured a third party in industry while others adopted an independent attitude. There was no desire to make all the various associations with different interests conform to one type, but it was hoped by discussion to make them all adopt a common policy.

A somewhat lively discussion followed in which some speakers pleaded for the removal of those associations which were definitely allied to the labour movement, in order to remove any suspicion of a political bias in the new federation, while other representatives urged the desirability of emphasising the political aspect.

Some of the more technical scientific associations on the other hand resented joining a large federation composed of associations with so widely divergent views, in which the pure technical interests would be lost sight of and outvoted.

An amendment to the proposed resolution for the formation of the federation was then moved; this was supported by the representatives of the British Association of Chemists, but it was lost, and when subsequently the original motion was put before the meeting the B. A. C. representatives abstained from voting.

Mr. Richard B. Pilcher

Twenty-five Years' Secretaryship of the Institute of Chemistry

THIS week Mr. R. B. Pilcher completed his twenty-fifth year as Secretary of the Institute of Chemistry, and his friends throughout the chemical profession will offer him their sincere congratulations on so distinguished a record of service.

His association with the Institute (which was then housed at 9, Adelphi Terrace) began as far back as 1892, when he joined the office as assistant to Mr. George H. Robertson, then registrar and secretary, the successor to Mr. Charles Edward Groves, whose death occurred on February 1 of this year. Two years later Mr. Robertson, being stricken with blindness, Sir William Tilden, the president at that time, and the late Mr. David Howard, the honorary treasurer, asked the Council to give his assistant a chance, and Professor John Millar Thomson, of King's College, undertook to act as secretary in an honorary capacity for the time being. In 1894 Mr. Pilcher was appointed assistant secretary, and Professor Thomson honorary registrar and secretary. The following year Professor Thomson resigned from the secretaryship in favour of Mr. Pilcher, but continued in the office of honorary registrar until he became president in 1900, when Mr. Pilcher was promoted to the dual appointment.

Mr. Pilcher has thus been altogether 28 years with the Institute—two years as clerk, one year as assistant secretary, 25 years as secretary, and 20 years as registrar and secretary. During that time the roll of the Institute has increased from 806 members and 34 students to over 3,000 members and about 600 students. In 1917, on the completion of 25 years' service, the members of the Council of the Institute presented him with a silver rose bowl in appreciation of his work. Although he received some training in chemistry at King's College during the first few years of his association with the Institute, he does not profess to be a chemist. He was an early Fellow of the Chartered Institute of Secretaries, taking its certificate in Mercantile Law, and has served as a member of the Council of that body for over 12 years, acting during a considerable portion of that time as chairman of the Benevolent Fund Committee. He has promoted in that Institute the system of members taking registered students in their offices, a system which has developed in such a marked degree that, although at the armistice the number of registered students had fallen to 200, there are to-day over 3,000. He is the first president-elect of the Chartered Secretaries' Students' Society in London. Among his other activities he has been a member of the Board of Guardians for St. Giles and St. George, Bloomsbury, afterwards merged in the Holborn Board. He is past chairman of Council and a vice-president of the Association of Men of Kent and Kentish Men. He is a member of the Committee of the Chemical Industry Club.

Mr. Pilcher's work during the war is known to most chemists. As secretary of the Glass Research Committee of the Institute, he took a part in the initiatory work of promoting the manufacture of laboratory glassware in this country, and later served as a member of committees of the Department of Scientific and Industrial Research. Apart from assisting the authorities to obtain the help of chemists both for service with the forces and in connection with the production of material of war, he has served as a member of the Resettlement of Officers Committee. He also served with the Civilian Advisory Boards in France in 1919, and is still a member of the Grants Committee of the Ministry of Labour. For a few years before the war, apart from his ordinary work for the Institute, he was largely responsible for raising the building fund, amounting to about £25,000, and dealing with the details of the building itself. In 1906, he compiled "A List of Official Chemical Appointments" (4th edition, 1912); he is the author of "The History of the Institute of Chemistry" (1877-1914); joint author with Frank Butler Jones of "What Industry Owes to Chemical Science" (1917); and author of "The Profession of Chemistry" (1919), in addition to numerous reports and articles in the *Proceedings* of the Institute, and contributions to the public and technical press.

What Armstrong College Has Done for Science

IN an article in the *Newcastle Daily Chronicle* appealing for funds on behalf of the Armstrong College, Professor Bedson, a member of the staff and the president of the local section of the Society of Chemical Industry, says:—

The history of science provides many examples of how man's need has provided the stimulus for investigation and research, which have resulted in the solution of the immediate problem and also led up to the extension of knowledge, to advances fundamental to science. Davy's discovery of the safety lamp, in fact, is an excellent illustration. The need of the mines made known to the man of science led to a research into the phenomena of combustion, by which not only was the desideratum of the mines supplied, but knowledge was advanced and science enriched by discoveries fundamental to the understanding of the phenomena of combustion and chemical action generally.

The world's great need at the present day is a nitrogenous manure for the growth of the crops to provide food for its teeming population. The basis of all artificial fertilisers is nitrogen, combined either as nitrates or as in ammonium sulphate. The source of nitrates is mainly supplied by the Chilian deposits of sodium nitrates, and that of the ammonium sulphate is found chiefly in the compounds of ammonia produced by the destructive distillation of coal. To make this unlimited supply of uncombined nitrogen existing in the air available for the production of nitrates and of ammonia, is a problem that has occupied the attention and energy of scientific men for some years, and the processes used for this purpose have been the subject of examination and investigation by the Nitrogen Products Committee of the Munitions Inventions Department formed during the war by the Minister of Munitions.

Mr. H. A. Humphrey, reviewing the report of this committee, says that "No more important scientific report has ever been published by the Government than that of the 360 pages presented in May last to the Minister of Munitions." The importance of this report and the issues raised in it are so vital to the interests of the world, and of this nation in particular, I do not propose to discuss, but I refer to this question and its solution as an illustration of the benefits conferred by those who are content, stimulated by the desire to advance knowledge, to probe the secrets of nature, and by careful and exact measurement add to the sum total of knowledge, gained by observation on experiment of the world in which we live, which we style "Science." Such a one was the recluse Cavendish, who in the course of his investigation of the composition of the atmosphere, discovered the basal facts upon which the manufacturers of nitric acid from the air depends. In like manner, the successful synthesis of ammonia from its element are constituents nitrogen and hydrogen, is the outcome of researches into the laws which govern the equilibrium of the forces operative in chemical reaction.

Many more instances could be cited to show the necessity of provision for the teaching and research in the fundamental sciences. But the material advantages conferred on the communities possessing institutions in which science is taught and pursued are not the only beneficial influences these institutions provide. The presence of a college for higher education secures that the intellectual powers of the people of the district in which it is situated shall be developed to their maximum. The district which fails to make such provision must ultimately pay the penalty in the form of diminished efficiency.

AT THE MONTHLY MEETING of the North British Branch of Pharmaceutical Society of Great Britain, held in Edinburgh last week, Mr. D. B. Dott, F.R.S.E., F.I.C., communicated a note on "Opium Assay from the International Standpoint."

The Status of the Chemist

Paper and Discussion at the Chemical Industry Club

On Monday evening at the Chemical Industry Club, London, a Paper was read by Mr. J. W. Black on "The Essential Factors in the Improvement of the Status of the Chemist." Dr. Ormandy presided over a good attendance, and the Paper was followed by a keen and interesting discussion.

In introducing the subject Mr. Black assumed that all ngaged in chemical industry were agreed that their interests, whether as merchants, manufacturers, or chemists, were closely bound up with the improvement of the scientific and technical worker's position. He proposed (1) to state the essential factors in improving the status of chemists, (2) to offer suggestions as to how those ideals might be realised, and (3) to make some remarks on the problem of a chemists' organisation.

Essential Factors

Among the essential factors for improving the status of the chemist Mr. Black placed first a definition of what a chemist is, and at once dismissed the idea that there was some special difficulty in arriving at such a definition. The problem was how to deal with the large number of excellent and useful persons who were called chemists without actually being so, and how to get round the definition of chemist as stated in the Pharmacy Act of 1900, where the Mother of Parliaments had defined a chemist and done it wrongly. If, he argued, it was impossible to define "chemist," then it was impossible to define "surgeon," "physician," "barrister," or any other recognised profession. A surgeon was not less a surgeon because all were not Listers or Treves. A chemist was not less a chemist because all were not Ramsays or Crookes. Not all who took Holy Orders became Archbishops of Canterbury. It appeared to him that a chemist was a person who had been instructed in chemistry and such other branches of science as were necessary to the understanding of chemistry and who was qualified to practice chemistry either in pure science, or in its application to arts and industries, or in the service of man. Whatever objection might be raised to this definition, similar objection could be raised to any definition that could be formulated of any of the recognised professions.

Dealing with the second essential—to secure the adequate recognition of the definition when made—Mr. Black said that it had become apparent during the last 30-40 years that it was one thing to define and another thing to make the definition effective. During that time much had been done to produce persons who would satisfy any reasonable definition, and the whole history of the Institute was one of successful effort to provide such persons. He mentioned the Institute because that was the Institute's great aim, but he did not forget the chemical schools of our universities which had turned out great numbers of qualified men, a large number of whom were proud to add the hallmark of the Institute to their other qualifications. Yet, up to the outbreak of war, the chemist was graded lower than a clerk of anything like the same age and status. In the case of one large firm of employers the relative value of first-grade clerks and first-grade chemists was graded as 1·4 to 1. A possible explanation of this was that all were not chemists who were called so, and until they could prevent a host of partially trained men from assuming that title, so long would the chemist occupy a half-recognised position. They must secure their definition and there was only one institution which could make it and enforce it. That was Parliament, and to Parliament they must go.

The third essential was to take steps to realise the first and second points, and some body was required sufficiently exalted and authoritative to speak and act for all chemists, to be acknowledged by the profession as acting for it. It would be an inspiring experience to see a body of chemists of established position and reputation taking action on behalf of the whole body.

Constitution of Central Body

The body charged with these functions, Mr. Black suggested, might be a committee elected from the councils of the Society of Chemical Industry, the Chemical Society, and the Institute of Chemistry. It might also be a function of a sub-committee of the Federal Council. The interests of the industrial chemist would need to be properly represented and the terms of reference should be such as to make clear the solidarity and unity of all true chemists. Under such a body "chemist" would first be defined according to modern conceptions and standing, and the minimum of training and qualifications entitling a person to be called a chemist according to the definition should be laid down. In the future this must include University or Institute qualifications, but only under such conditions as enable one or other of those qualifications to be obtained by all, whatever their circumstances, who were willing to spend the necessary time, energy and money. They must not allow less fortunate circumstances to close the door on energy and ability or waste potential brain power as had been done in the past.

A Register of Chemists

Another function of this body, Mr. Black suggested, should be the compilation of a register of all who were qualified according to the standard chosen or whose experience, position, or reputation made them independent of those adventitious aids. Moreover, if they were really about to embark on a clear-cut policy there must also be placed on the register of chemists all who were earning their living as chemists, even if they could not produce evidence of qualifications or of achievements equal to qualifications. Provision must also be made to meet the case of those who were in process of training to become chemists, without being likely definitely to qualify according to the approved standard. This could be done by admission to the Register of Chemists for a determined number of years after it was instituted, to ensure that no injustice was done. After that period no one would be placed on the Register who had not conformed to the minimum qualification laid down.

The last and most important function of the committee would be the passage of a bill through Parliament to give legal effect to the definition agreed on and sanction to the privileges of the Register. The tendency would be to draw all chemists under one banner, and band them into one instead of into various associations, speaking not always the same language. He suggested that all chemists on the provisional Register should pay a small yearly subscription to provide the means of carrying on the work outlined, and in the event of a measure being passed through Parliament all chemists on the Register would be legalised as entitled to the name and admission to the Register of Chemists might be the formal sanction for a chemist to practice.

Labour and "Black-coats"

It was noteworthy that two days after he had promised to prepare his Paper, the press announced the great bid that organised labour had made for the support of the black-coated worker. There was much in that action of labour which would be welcomed by all thoughtful people, and they must not shut their eyes to the disposition on the part of professional workers to lean rather towards the Labour alliance and withdraw from the tacit alliance with the employer which had existed up to now. Yet, while welcoming close sympathy and understanding between all classes of employed people, conceived in no spirit of antagonism to employers, he did not think that professional workers' interests could best be served by a definite alliance with Labour and identity of methods. He could conceive of an organisation for chemists which in its own place and way might render much service to reasonable labour claims and equally great service to employers, while protecting its own interests through the intervention on broad lines of one universal authority acting for all chemists. A committee acting as custodian of the Register of Chemists on which all working chemists were placed, might easily become a general chemical council and the rank and file of the members would form a new British Chemical Association which even before and certainly after the legal sanction had been obtained, would be able to act as one body, obeying the recommendations of the Council in abstaining from accepting underpaid positions involving great responsibility, protecting the interests of individuals, and maintaining a high standard of professional etiquette. The immense pressure which such an Association could bring to bear in quite a dignified way on those who controlled the interests of its members need not be emphasised. This appealed to him as the true organisation for chemists and he saw nothing to prevent the National Association of Industrial Chemists and the British Association of Chemists from merging their present interests and influence in the support of such a wider and more embracing scheme.

In the course of a vigorous discussion, which was directed with much tact and humour by the chairman, attention was drawn from many points of view to the economic position and prospects of chemists. When speakers pointed out the difficulty of enforcing any demands on employers it was frankly suggested that an alliance with Labour seemed the only effective remedy. The latter view, however, did not seem to be generally shared. The prevalent opinion appeared to be in favour of effecting the desired improvements, if possible, by some kind of professional organisation, and a wish was expressed for some united body capable of acting for chemists as a class.

The proceedings closed with a hearty vote of thanks to Mr. Black.

Dr. Carl L. Alsberg, Chief of the Bureau of Chemistry, U.S. Department of Agriculture, spoke before the Chicago Section of the American Chemical Society recently on the precarious position of the various scientific bureaux of the Government. This scientific work has always been of a high standard, yet there has been a very rapid and critical deterioration in the past few years. There has been no change in the salary scale for 20 years, although recently a bonus of $240 a year has been granted to all appointees who receive a salary of less than $2,500 annually. The consequence of this has been that in the past year there has been a turnover of personnel amounting to 45 per cent. One laboratory staff of 12 has lost 18 men during the past two years, including its director. Salary increases of from 50 to 500 per cent. are needed to prevent the absorption of the Government scientific personnel by the industries. Not only is this not forthcoming, but Congress is even threatening to make conditions worse.

Filtration and Softening of Water

Lecture by Dr. G. Grant Hepburn

THE first of a series of three lectures upon "Water Supplies: Their Filtration and Softening" was delivered by Dr. G. Grant Hepburn (Specialist in Water Purification), at the Manchester College of Technology, on Monday, February 16.

Chief Methods of Purification

Dr. Hepburn began his lecture by stating that the two main methods of water supply purification were (1) filtration, and (2) softening, while of subsidiary consideration in respect of frequency of application were sedimentation alone, and distillation. Sedimentation was frequently employed as an adjunct to filtration when the suspended matter was high, and distillation was also resorted to, by means of multiple effect plant, when there was excess of saline content. Of the two chief methods filtration was by far the more important from the standpoints of public health and the volume of water purified. All town supplies that contained suspended matter; that were liable to contamination; that from their extreme softness or acidity would cause lead poisoning; or from their colour present an unappetising appearance, were, or ought to be, purified by filtration, with or without chemical treatment as the case demanded. It was but seldom that the process of softening was adopted for a town's supply, notable exceptions being those of Ilkeston and Heanor, Swadlincote and Ashley and Bolsover. Besides reducing the hardness, the bacteriological and organic purifications effected by a process of softening were high; iron was totally eliminated, and a water of irreproachable appearance was obtained.

The advantages resulting from the softening of town supplies would frequently be much greater than those obtained by filtration, but the difference in cost of plant and chemicals was so very much less with filtration that this method was generally adopted.

Cases sometimes occurred where a small town or village water supply was so bad, owing to the amount of suspended matter, bacterial contamination, smell, colour and lead solvent action, that considerations of cost were of but slight importance, and softening followed by filtration was the proper method to employ.

Filtration Methods

Dr. Hepburn then dealt with the question of filtration in relation to ordinary or submerged sand beds, non-submerged sand beds, and mechanical filters. The first great scheme for the purification and filtration of water through sand beds was that carried out by Simpson, for the Chelsea Water Company, to deal with part of the London supply. Until 10 or 15 years ago Simpson's method held the field, but it was now rapidly giving place to modern meth ds of mechanical filtration. An illustration of a vertical section through an ordinary sand-bed filter was then shown, and it had been calculated that in such a bed of sand, with grains from 5 mm. downwards, (*a*) 1 cubic ft. presented a surface of 0·127 acre, or 10 do. = 1¼ acre surface, giving a tremendous area for bacterial growth; (*b*) the thickness of the streams of water passing through the bed were less than 1/5,000 mm., or less than 5 mikrons, thus giving an idea of the diameter of the particles that might pass; (*c*) the rate of passage downwards through the bed for two million gallons per acre per 24 hours = 0·1 mm. per second, a rate giving a very small downward pull on bacteria and microscopic particles attracted by the sand or settled on it. But even with such very advantageous conditions a sand bed of the type under consideration was useless, giving a filtrate not much better than the raw water; to be useful it must be matured in the following manner. Water should be slowly filtered to waste perhaps for five or six weeks. During that interval of time the water over the sand deposited its suspended matter thereon as a film; in this film the bacteria associated with it increased and multiplied to an enormous extent, rendering it less pervious to the very finest suspended matter and to bacteria themselves. The same process went on in the upper layers of the sand, there being a partial plugging up of the sand interstices by the finer suspended matter which had passed the surface film and by bacterial activity. When this process of maturing or ripening had proceeded far enough the filter was ready for use, and would:—

(1) Remove 98 to 99 per cent. of bacteria.

(2) Reduce the organic matter about 60 to 70 per cent., but this reduction might also fall as low as 10 per cent.

(3) Furnish a clear and limpid water, provided the raw water was not discoloured by organic substances, as, *e.g.*, peaty matters.

A new filter once started in this way ran for many years, only as it worked its output for a given filtering pressure or head gradually diminished, and when the output had sunk to about one-half the normal, which might be in from two to three months with water fairly free from suspended matter, filtration was stopped. The filter film and a few centimetres of sand were then skimmed off and the filter started again and worked until a second skimming was necessary, and so on. When skimming had been repeated many times the sand removed (which in the meantime had been washed) was put back into the bed.

Analysis of Sand in an Old Filter

An examination of the sand in an old filter gave the following results:—

1 cc. of Sand.	Bacteria.
At surface	4,000,000
1 cm. below surface	1,038,000
2·5 cm. below surface	756,000
5·0 cm. below surface	210,000
50·0 cm. below surface	56,700

Immediately before sampling the bed the filtered water contained only 20 bacteria per cubic centimetre. That the purification effected by the sand bed was due to the presence of the enormous numbers of bacteria in the first few centimetres depth of the filter was proved by the experiments of Piefke. Thinking to get better results, Piefke sterilised the sand and at once got results the opposite of what he expected, viz., (*a*) Immediate great increase in the number of bacteria in the filtrate; (*b*) filtrate not clear; (*c*) chemically the filtrate was little different from raw water, and was quite useless for domestic purposes.

These conditions lasted through five periods of filtration in which the pressure rose to 31 in. for an output of 100 mm. depth of filtrate per hour, the dirt being removed from the top of the filter at the end of each period. It was not until the end of the fifth period that the filtrate began to improve, but it was long after that before the results were comparable with those of an old filter. These results were in accordance with the results obtained from water drawn from different depths of the same bed, which showed that after the first few centimetres depth had been passed no further purification was effected. This, in turn, accounted for the distribution of the bacteria in the bed; for by the time the water reached a few centimetres depth it was so poor in nourishment for bacteria that they failed to thrive in it in the bed. From these experiments it was clear the chemical purification was due to bacterial activity.

It was therefore quite obvious the submerged sand bed was not a satisfactory instrument for the filtration of town supplies for the following reasons:—

(1) It was no guarantee against water-borne disease as it allowed 2 per cent. of the bacteria to pass; and it had actually been proved by Piefke and Fränkel that cholera and typhus germs passed through.

(2) The process of skimming was laborious and expensive; in the skimming the most effective layer was removed, and whilst it was being done the bed was out of commission and was liable to contamination by the workmen.

(3) After skimming, the bed gave inferior filtration for several days.

(4) The normal rate of filtration was slow, *i.e.*, approximately 2 million gallons per acre per 24 hours, and, owing to stoppages, the average actual rate might be half that.

The submerged sand bed had done good service for about a century, but it might be accepted as a fact that from the present time very few, if any more, would be put down.

Non-Submerged Sand Bed

Dr. Hepburn then proceeded to describe a second type of sand bed, viz., that adopted by Miquel and Mouchet. In 1902, Janet proposed to increase the supply of pure water available for Paris by springs which had their source of supply from subterranean lakes by raining water artificially in great quantity on the natural sand beds which supplied these natural lakes in times of rain. By the adoption of this method Janet expected to obtain from the springs from 10 to 20 times their natural output. Miquel and Mouchet investigated this proposal by the aid of experimental filters, with the result that after two or three years rigorous testing their system of artificial non-submerged sand-bed filtration was adopted for the supply of a small town of about 7,000 or 8,000 inhabitants 80 miles south-west of Paris.

Dr. Hepburn then described Miquel and Mouchet's installation in great detail, showing illustrations by means of lantern slides.

The advantages of the Miquel-Mouchet system over that of Simpson were:—

(1) None of the bacteria that were in the raw water passed into the filtrate; the process was, therefore, a reliable safeguard against water-borne disease. In a series of experiments extending over several weeks, hourly samples having been taken during the working day, 250,000 million Bacilli Coli per square metre of bed surface were fed to filter and none were found in the filtrate.

(2) After clarification, if necessary, of the water, the filter worked for several years; only a yearly clearing of the top part being required.

(3) The output might rise to two or three times that of the submerged bed.

It must, however, be observed that this system was not likely to find favour on a large scale on account of the relatively large capital charges; though it was excellently suited for farmhouses and country mansions or for small villages or towns which had a very bad water to depend upon.

Rapid Filtration

The third system of filtration was that of rapid filtration through mechanical filters. The distinguishing features of the method were:

(1) Sand beds permitted a filtration only of one to two gallons per square foot of bed per hour, while by mechanical filtration (for

towns) a result of 100 to 125 gallons per hour was attained, and for works purposes 200 to 250 gallons and even rising to 300 gallons per hour per square foot of bed.

(2) As a consequence of high output only a small ground surface area was required.

(3) The bed was washed daily, or every other day, in from 3 to 10 minutes, and without possibility of contamination from workmen.

(4) The results (with chemical treatment) were equal, or superior, to those from submerged sand beds.

Slides were then thrown on the screen illustrating the various types of Mather & Platt, Ltd., The Paterson Engineering Co., Ltd., and Bell Brothers.

Catalysis from an Industrial Standpoint

Paper by Dr. E. B. Maxted

DR. H. W. BROWNSDON presided on February 12 at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry, when Dr. E. B. Maxted read a Paper on "Catalysis from an Industrial Standpoint."

An idea of the magnitude of the output of some of the more important catalytic processes might be obtained, Dr. Maxted said, by quoting the figures for the annual production of, for instance, sulphuric acid, which even before the war was, for this country alone, of the order of one million tons, while the industrial development of comparatively recent processes, such as the hydrogenation of oils and the synthesis of ammonia, was a noteworthy example of the ever-increasing utilisation of catalysis for the foundation of new industries of the highest importance.

In the absence of general theoretical principles, which should render possible the production of suitable catalysts for a required reaction, the discovery of new catalytic processes and of suitable catalysts had necessarily been made by the purely empirical method of trial and observation, except in so far as the choice of a probable catalyst was guided by analogy with known reactions. In spite, however, of this unsatisfactory general position, catalysis was becoming of ever-increasing importance, both for the mere acceleration of reaction, which proceeds also in the absence of a catalyst, and, as what may be regarded as a limiting case of this class, for the realisation of reactions which do not proceed at all, as far as can be measured, unless induced by a suitable contact body.

Catalyst Poisons

From an industrial standpoint, in view of the necessary employment of commercial, and therefore impure, materials, the study of catalyst poisoning was almost of equal importance to that of catalysis itself, especially since the large-scale development of a catalytic operation was almost invariably concerned with the recognition and removal of traces of inhibitive substances, the procedure adopted towards this end being typified by the now classic work of Knietsch and his collaborators in connection with the commercial establishment of the contact process for the manufacture of sulphur trioxide. While, however, the fruits of this purely experimental study, both of catalysis itself and of catalyst poisons, were indisputably great, it could not be too strongly urged that the systematic and intensified development of catalysis in the future depended on a better understanding of the theoretical principles which underlay the mechanism of the various types of catalytic processes, these principles being not necessarily the same for every case.

Whatever might be the exact mechanism whereby a given reaction was accelerated catalytically, many well-known examples might be adduced to demonstrate the energetic and intimate part which the catalyst played in promoting the reaction, its physical form being entirely altered by such participation, by deep-seated cyclic or other changes, at the conclusion of which the catalyst emerged identical chemically, with the material originally taken. Well-known examples of this were the physical changes undergone by metals, such as platinum or copper when used for decomposing ammonia, or in platinum nets employed for ammonia oxidation. An example of the purely chemical promotion of a reaction might be found in the part taken by oxides of nitrogen in the chamber process for the manufacture of sulphuric acid, in which intermediate products might actually be separated by suitably adjusting conditions. Another instance of this type of participation was given by the catalytic production of hydrogen by the interaction of water gas with steam in the presence of iron.

A general theory of catalysis, which would apply universally to every type of reaction, was, in all probability, impossible, and each reaction, and indeed each catalyst employed for a given reaction, must receive special consideration with the object of setting up certain types of accelerating mechanism, for each of which separate theoretical principles would be involved. This was the necessary preliminary step to what, from a practical standpoint, was the most important task of catalytic theory—namely, the production of the degree of activity of a catalyst for a required reaction at a given temperature.

Types of Catalysts

Of all the oxidation catalysts of the first place, Dr. Maxted said, platinum was probably by far the most generally applicable; this metal was employed *inter alia* for the oxidation of sulphur dioxide to trioxide, of ammonia to nitric oxide, as well as, generally, for the catalytic oxidation of organic bodies of the most varied nature. It had been shown that the heat of occlusion of oxygen by platinum was of about the same magnitude as the heat of formation of platinum monoxide, but whether or not this oxide was an intermediate product during catalytic oxidation was by no means proved. The second class of oxidation catalysts consisted almost exclusively of substances which possessed the property of forming higher oxides, which, in order that the reaction might proceed to completion, must, if they were formed as intermediate products, be unstable under the conditions employed for the reaction, these conditions including the presence of the body to be oxidised.

An example of this class of activator was to be found in the evolution of oxygen from bleaching powder in the presence of nickel or cobalt oxides. Cobalt, for instance, formed an unstable oxide possessing the composition CoO_2, which might actually be prepared by the action of iodine and an alkali on a cobaltous salt, but which was unstable under the conditions employed for the evolution of oxygen for the reaction in question. Other examples of the class—that is to say, of bodies capable of forming higher oxides than are stable in the presence of the body to be oxidised—were to be found in the use of manganese, nickel, lead, or cerium salts for catalytically accelerating the oxidation of linseed and similar oils.

Nitrogen activating catalysts had become of rapidly increased technical importance during the past decade. Iron would appear to be the most generally useful catalyst of this nature for reactions carried out in a temperature region of from 500° to 1,000°C., for instance, for the synthesis of ammonia, and in the Bucher process for the synthesis of alkali cyanides. Iron did not form a nitride directly, although this could readily be obtained by interaction with ammonia. Other examples of nitrogen catalysts, the mechanism of which was not easily understood, were the acceleration of calcium cyanamide formation by calcium chloride, and the remarkable activity of osmium for the union of nitrogen and hydrogen.

In conclusion, Dr. Maxted dealt briefly with the possibility of setting up a standard scale of activities on which, for the purposes of reference and comparison, it should be possible to express as a number the observed activity of a catalyst for a given reaction. It cannot be doubted, he said, that some form of activity scale, to which catalysts could be referred in order to ascertain whether a preparation which was being used had a proper activity, was urgently wanted, but the most suitable and most widely applicable basis for constructing such a scale was a matter for careful deliberation.

Oil Fuel in Chemical Works

SPEAKING on "The Utilisation of Oil Fuel in Chemical Works" before the Liverpool Section of the Society of Chemical Industry at the Adelphi Hotel on Friday, February 20, Mr. W. P. Dreaper described some interesting experiments which he carried out in a Government factory in Lancashire during the war. They were undertaken, he explained, at a period when the great extension of chemical plant in this country made it difficult to obtain producer gas plant, and when time was the essence of the contract. Prior to the war oil fuel had been used intermittently for steam-raising purposes in possibly a dozen chemical works, but there was little evidence that it had been utilised on the chemical plant itself.

In the experiments which Mr. Dreaper conducted mixtures of tar and pitch formed the principal fuel, the proportion of pitch reaching 75 per cent., while the remaining tar consisted of almost half pitch. The superiority in heating efficiency of oil fuel over coal, the author said, was out of all proportion to the relative calorific value; it might be put as high as two to one. Outstanding advantages were complete and rapid combustion, higher temperature, and lesser volume of flue gases. The moment the oil burner was lighted, there was practically full heating efficiency, and immediately the operations were concluded the burner could be turned off, and there was no useless call upon the fuel supply. There was also a very considerable saving of labour. Where oil fuels were used for locomotive purposes, the fireman had very much less work to do than the driver. In a chemical works one man could easily attend to the oil burners in a battery of six 10-ton pots, and when the burners were working properly, had practically nothing to do. Increased output might be looked for, and undoubtedly a more constant temperature could be maintained. While purposely avoiding the commercial question of the relative costs of fuels, Mr. Dreaper instanced an acid-concentrating plant in which the substitution of oil fuel for producer gas was followed by 60 per cent. increase of output. He explained two types of burners, one of Warrington manufacture and the other the product of engineering experience in the oilfields of Texas, and emphasised the necessity of working out the minutest detail in the application of the oil fuel system of particular processes.

Remuneration of Chemists

An Interesting Institute Return

In the new number of the *Proceedings* (now published under the title of *Journal and Proceedings*) of the Institute of Chemistry, the table reproduced below is given of chemists' salaries based on statistics furnished in response to a *questionnaire*.

Altogether (the *Journal* states) about 1,000 replies were received. The table refers exclusively to appointments in Great Britain and Ireland. The figures probably represent a lower average rate of pay than that actually received, owing to the circumstance that many members have not forwarded their returns. It should be borne in mind also that, as these figures represent the returns of chemists who occupy whole-time appointments, they do not constitute a gauge of the progressive financial status of the average chemist, since a very large proportion of the more successful men, as they grow older, cease to occupy such appointments, and either become private practitioners, directors or owners.

The average rate of pay for all branches at 25 years of age is about £310, and the average annual increment up to 30 is about £15. In industry the average rate of pay at 25 years is £320, with annual increments of about £20. The average increment at about 35—45 is not maintained. This may be due to the fact that the more successful men are at this stage setting up in consulting practice or joining the directorate. In three branches of work the number of returns after the age of 45 is not sufficient to afford any definite indication of the position of men at that age.

The returns, on the whole, indicate less discontent than might reasonably have been anticipated in view of the figures given above. For the reasons already stated, they cannot be taken as representing the true position; but they reveal the fact that too many highly qualified men are earning far less than they should at the present time of stress and high prices of all ordinary commodities, especially in view of the wages of skilled labourers, examples of which are here quoted:—

In shipbuilding—apart from peicework—skilled craftsmen earn (on repairs) up to 86s. 6d., plus 12½ per cent. bonus, a week of 47 hours; and (on new work) up to 75s. 6d., plus 12½ per cent. At 86s. 6d. +12½ per cent. the total amount for the year is £251. 15s. 8d. In engineering—up to 80s. 6d. +12½ per cent bonus, week of 47 hours—*i.e.*, £235. 6s. a year.

In building trades—up to 1s. 11d. an hour, 46½ hours a week in summer, 44 hours in winter—*i.e.*, about £225. 11s. a year.

In the furniture trades—up to 2s. an hour, 47 hours a week—*i.e.*, £4. 14s. a week; £244. 8s. a year.

Industrial Chemists

The returns from chemists engaged in industry are more numerous than the remainder. It is certain that many chemists occupy positions of responsibility in industry at quite incommensurate salaries, and that among these are some whose employers do not realise fully the value of the services rendered by their chemists, or do not yet appreciate the need for scientific methods in manufacturing operations. There appear to be still several concerns in which the directors are ignorant of science, and, therefore, unapproachable on scientific matters. Their interests lie solely on the business side, and they take little or no interest in the means which contribute so largely to modern developments so long as the ultimate result, from their limited outlook, appears to be profitable. The prospects of promotion of the chemists in such concerns are rendered very uncertain, and they have little chances of success unless they can show an aptitude for commercial matters, or unless their work becomes sufficiently well-known to bring them offers of appointments elsewhere. The bulk of the returns under industry refer to the salaries of chemists between the ages of 25—34, which may be regarded on the whole as evidence that the demand for chemists has been developed recently, and this should be some encouragement for the future prospects of employment of men now at college.

Comparatively few members of the Institute are less than 25 years of age, owing to the fact that the output from the colleges during the war has been almost negligible. A chemist who hopes to attain managerial responsibility must certainly be a man of affairs, able to represent his employers and to conduct business They may complain that they wish to remain *chemists;* but the demand is for chemists who are business men. Some, however, who are in sole control of operations on the works complain that they have no voice in the management, policy, or development of their concerns and that they are called to board meetings merely in an advisory capacity; but it would seem reasonable to suppose that sooner or later, their advice should conduce to the fuller realisation of their worth, especially in view of the fact that the number of chemists who occupy positions as directors is increasing.

The returns show, repeatedly, that the chemists in senior positions are subject to few, if any, unreasonable restrictions; that they are quite satisfied with their agreements; that they enjoy a free hand, and are independent of all interference; have a seat on the management; are encouraged by the consideration given to their views; have a share in the profits or a commission (or royalties) on their processes, or, otherwise, "an interest in the business."

A fairly large proportion of the returns have been received from ex-service chemists who have been away from their professional work for several years, and many of these, after a short period of probation, have become settled in far better appointments than they held before the war. They are mainly occupied with works management, and one states that he is "not suspected of being a chemist." The majority have been engaged without formal agreements with sound and well established companies and firms, prepared to treat them on a basis of mutual confidence, good faith, and reciprocal consideration. On the other hand, there are some instances of ex-service chemists who are re-employed at salaries very little in excess of the pre-war salary.

The Question of Contracts

The much vexed question of contracts is by no means to be settled easily by the suggestion that a standard form should be advocated, though that is a suggestion which has been under consideration, and will not be overlooked. The conditions of appointments in various industries and localities differ in many respects. The hours of working may begin at 8.30 a.m. or earlier, and close at 6.0 p.m., or later, or may be arranged by shifts in the case of continuous operations. In a few instances the system of "clocking on and off duty" applies to the chemists as to workmen. Some chemists are required to live within easy distance of the works, and are liable to be called at any time, day or night; some are expected to work on Saturdays, Sundays and Bank Holidays without additional overtime pay, such conditions being provided for in the original agreement, and presumably understood and accepted accordingly. "Overtime" is not very commonly paid among professional men; but it should, undoubtedly, be made good either by periodical material reward or by the allowance of additional leave. When the chemist is required to travel frequently on behalf of a company of some importance, first-class fares are commonly allowed and hotel expenses, the minimum amount for the latter being given at 15s. per day, a very moderate sum for the pre-war period and certainly too low for the present time, while all hotels are charging high rates and taking advantage of the general shortage of accommodation in important commercial and industrial centres.

Contracts for two or three years are fairly common; those for five years or more are comparatively few. Generally a company reserves the right to give three months'—in some instances only one or two months'—notice, while the chemist can determine the contract only at the expiration of the term; but the right of the company is in such cases usually to be exercised only in the event of misconduct or neglect of duty. The chemist is commonly expected to devote his whole time to his appointment; but some are allowed to undertake private practice by arrangement with the directorate, provided they do not act in any way for the benefit of competitors to the com-

Number of Chemists employed.						Age.	Average salaries including bonus.					
Industry.	Assistants to private Practitioners.	Government Service.	Municipal Service (whole-time).	Teaching.	Total.		Industry.	Assistants to private Practitioners.	Government Service.	Municipal Service (whole-time).	Teaching.	Average.
25	...	11	...	4	= 40	21—24	£268	...	£250	...	£184	£250
216	...	50	7	33	= 306	25—29	345	...	327	£284	270	328
148	5	26	15	30	= 224	30—34	435	£289	346	290	291	390
87	...	17	12	19	= 135	35—39	546	...	447	360	421	499
63	3	10	6	18	= 100	40—44	606	484	503	440	400	523
21	1	7	5	21	= 55	45—49	712	400	545	653	481	592
20	2	1	3	9	= 35	50—54	883	275	1,290	775	653	789
10	...	4	2	7	= 23	55—59	609	...	586	531	766	571
4	...	1	...	4	= 9	60 and over	610	...	840	...	888	747
594	11	127	50	145	=927							

The table shows (1) the number of returns received under each heading for each age; (2) the ages taken quinquennially (except in the first group); (3) the average pay for each heading according to age; and (4) the average pay generally for each age.

pany. No exception is ordinarily taken to chemists pursuing research in their spare time, provided the interests of the employer are not disregarded. Many chemists complain that they are not permitted to publish particulars of their work, all records and results being the property of their principals. In some instances, where publication is allowed, the results appear as the work of the employers rather than that of the chemist who has initiated and conducted the experiments. Chemists who aspire to doctorate degrees or similar qualifications may thereby experience difficulty in establishing their claim for recognition. Some are occupied almost entirely with routine work, though of a varied character, and have no time for research. On the other hand, others are encouraged to publish Papers, and enjoy considerable freedom in discussing matters of industrial importance with their professional brethren.

Trade secrets are jealously guarded as far as possible, and restraint from joining competitors is frequently to be enforced for two years or a longer period after the termination of the agreement. Patents are generally taken out in the joint names of the inventor and the company, but they may become entirely the property of the company. They are sometimes assigned to the company in return for royalties, and the inventor may sell all rights on relinquishing his appointment; or such matters may be subject to arbitration by an independent authority agreed upon by both parties. Profit-sharing schemes and provision for commissions on results are not uncommon, and few of the returns show ground for distrust of British employers.

Some contracts involving restraint, with binding clauses as to secrecy, provide for a considerable proportion of salary during unemployment for a stipulated period after the chemist has left the company or until he obtains an appointment (within a reasonable time) elsewhere. Penalties are to be imposed for breach of agreement or disclosure of secrets to the disadvantage of the previous employers, and bonds of assurance are entered into on that account; but many chemists think that consent will not as a rule be withheld so unreasonably as to prevent them from continuing in their profession. It appears advsiable that the chemist should beware, however, of too close specialisation over a long period, and should keep abreast of current work generally, so that he may not find it difficult to turn to a fresh industry. Those who keep themselves well informed have no difficulty in proving their worth in other industries, and in the light of their experience are often able to take a new point of view on the problems submtted to them.

Security of tenure of appointment is generally assured in the case of competent and qualified men in well-established concerns. Many companies provide pensions or superannuation schemes on a liberal basis, the employer contributing—if not the whole—a large proportion of the premiums. Pensions are based on length of service, and generally somewhat on the lines of the Civil Service superannuation scheme, or they may be determined according to the responsibility and the nature of the service rendered. Pay during illness—even prolonged illness—has been frequently allowed and gratefully acknowledged.

In some few appointments there are concessions such as the provision of quarters, luncheons, teas and so forth.

Prospects

The prospects of chemists vary very much according to the branches of work in which they are engaged. Those who are engaged in industry have in most instances indicated a fairly satisfactory outlook; many more than formerly hold appointments as managers and assistant managers, or have good reason to expect promotion to such positions; but, while this affords ground for hope that chemists will receive increased recognition and are likely to be employed in greater numbers, it must be remembered that the output from the universities and colleges will in all probability be in excess of the demand for some years in the immediate future. These remarks, however, apply chiefly to chemists engaged in control of operations and in research, but in a less degree to chemists whose work is mainly in analytical laboratories whose prospects are problematical. Advancement often depends as much on the man as on the chemist—on ability, initiative and resource rather than on high attainments.

Leave

The allowance of only a fortnight annual holiday besides Bank Holidays appears to be far too common. It is believed that employers as well as their chemists would benefit from a more generous annual holiday, especially where the chemists occupy positions of responsibility and control. Provision is often made, however, for the annual leave to be extended according to the years of service, and many senior men are at liberty to take Saturdays and occasional short leave at their discretion.

War Bonus

The replies under this head indicate that war bonuses will generally become permanent additions to salaries. In fact, increased cost of living appears to have been met in most cases by permanent advancement of pay rather than by bonus; where a bonus has been paid, the amounts have varied from 5 to 60 per cent., and in a few instances beyond that. In special cases it has been based on a profit-sharing scheme. It should be remembered, however, that a great deal of voluntary professional service of a highly technical character has been rendered by chemists without any form of reward or recognition, and complaints that little consideration has been given to the prevailing economic conditions are fairly numerous. It is difficult to avoid the impression that in some instances, the employers took advantage of the fact that chemists above a stated age (varied from time to time) could be retained from military service. The military authorities frequently refused to enlist chemists, but this was not usually the case where commissions involving some degree of scientific knowledge were available; there was never any difficulty in securing chemists for active service, while there was occasionally a shortage of those possessing specialised technical experience.

Private Practice

The returns from assistants to private practitioners are very few (eleven), and afford an unreliable guide to the position. Many assistants who were engaged in private laboratories before the war have gained experience which has enabled them to obtain appointments in industry. In some such laboratories the principals do most of their work themselves, with the help of pupil assistants and laboratory attendants. Assistants in some cases have the privilege of working for their own *clientele* or hold appointments for other work by arrangement with the principals, or are paid according to the varying extent of the practice and the work done.

Other Branches of Service

In teaching the scope for advancement is more restricted than in industry, the number of higher appointments being fewer. The pay shows progressive improvement except for the ages 4 —44, but it is very meagre for present conditions, the average rate at 25 years being only £230, with yearly increments of about £25. Many teachers are now overworked through the recent increase in the number of students in the colleges. Hours of working are in many cases excessive, especially in technical schools. Holidays are much longer than in other branches of work.

Government service should show figures at least comparable to any other branch of work; but although there is a steady rise up to 50 years of age, the figures cannot be said to afford a satisfactory prospect for a qualified man under present conditions. They would hardly have been regarded as encouraging under pre-war conditions, and it is common knowledge that many Government chemists have accepted appointments in other branches, in some cases foregoing their accrued pension contributions. The war bonus of 20 per cent. +£60 (since modified to 30 per cent. +£66) is included in the figures given in the table. Hours of working and the periods of leave are usually more favourable than in industry.

Municipal service (whole-time) is even less satisfactory than Government service, especially up to the age of 45, when it shows an improvement; but in this branch the numbers are comparatively few.

The returns received from women fellows and associates number 20, and show an average rate of pay in any branch of work considerably lower than that for men, although many are, undoubtedly, very able workers whose services deserve far more substantial recognition.

The Late Professor Emerson Reynolds

DR. JAMES EMERSON REYNOLDS, a past president of the Society of Chemical Industry, died on Tuesday of last week. Although Dr Reynolds qualified to practise medicine his interests lay in chemical investigation. In 1867 he became Keeper of Minerals at the National Museum in Dublin; in 1870 Professor of Analytical Chemistry at the Dublin Royal Society; and in 1873 Professor of Chemistry at the Royal College of Surgeons in Ireland; and in 1875 he was appointed to the Chair of Chemistry and Chemical Philosophy at Dublin—a position which he retained until 1903. He described the isolation of the true sulphur urea in 1869, and carried out many researches on the derivatives of that substance. His discovery of a new group of colloid bodies containing mercury was announced in 1871 to the Royal Society of London, of which he was elected a Fellow in 1880, and he also interested himself in the chemistry of the element silicon, of which he prepared many new organic and other derivatives. Others of his numerous published Papers were concerned with spectrum analysis, the periodic law, and electro-chemistry. He was the author of "Public Lectures on Experimental Chemistry" (1874), and "General Experimental Chemistry" (1886), and joint author of a "Manual of Public Health for Ireland." He served as president of the Society of Chemical Industry in 1891, president of the chemical section of the British Association at its Nottingham meeting in 1893, and president of the Chemical Society in 1902-3.

Synthetic Dyestuffs

THE last of a series of lectures arranged by the Huddersfield Textile Society was given at the Huddersfield Technica College on Monday, February 22, by Mr. J. Turner, of the British Dyestuffs Corporation, who spoke on "The Importance of the Synthetic Dyestuffs Industry."

Purchase of German Dyes

British Commission's Report

On January 17 a Purchasing Commission of the Colour Users' Association went to Germany to consider the position in regard to dye wares, and returned on February 1. Since then they have drawn up a long report, which has been sent to the Board of Trade. The following abbreviated report has been issued for publication :—

The object of the Colour Users' Purchasing Commission was first to ascertian what stocks of dyes are available in Germany over and above the so-called " reparation dyes." By this term, "reparation dyes," is meant the 50 per cent. of Germany's colour stocks at the signing of the peace treaty, which quantities are to be shared among the Allies and set off against war indemnities, according to the treaty provisions. The idea of the Colour Users' Commission was to purchase any extra suitable stocks which are available at the moment, or which will become available in the near future.

The first conference with representatives of the German colour companies took place on January 20 at Leverkusen, near Cologne. Dr. C. Hess (F. Bayer & Co.) presided for the German firms, and it was arranged that a further conference should be held at Frankfort a few days later. This meeting took place on January 23. Dr. von Schnitzler (Meister Lucius & Bruning) acted as chairman for the Germans, the firms represented being Meister Lucius & Bruning, the Badische Aniline & Soda Fabrik, Leopold Cassella & Co., Kalle & Co., Griesheim Elektron, and Berlin Aniline Co. At a third conference, held at Cologne on January 29, several arrangements for purchases were finally concluded.

So many conflicting reports have been current in this country as to huge accumulations of colour awaiting purchase in Germany—an impression confirmed by the recent activity in this country of agents of the German producers offering the old standard lines—that it may be well to state at once that the experience of the Purchasing Commission goes to show that the stocks available are comparatively small. It was difficult to get at the exact situation, but French, Italian, Belgian, American, and, in fact, foreign buyers generally, appear to have been busy in the non-occupied regions trying to buy up all surplus stocks. Another important matter is that, as regards most of the works, little or no production is now going on, owing to the shortage of coal and raw materials. One striking exception is the large works situated in the area occupied by the British, where efforts to help along production of colours appear to have met with a fair measure of success.

Germans Perplexed by the Visit

It is, perhaps, natural that the Commission should find German makers somewhat perplexed at first by the purpose of their visit. Since the Sankey judgment in the Manchester test case there has been no bar to importation into this country of certain commodities the entry of which was strictly controlled during the war under Government licence, and it is no secret that transactions have been entered into by individual firms—even by firms represented in the Purchasing Commission—through agents of German colour makers. The British business man usually takes practical views, and if a door is suddenly and unexpectedly thrown open, even temporarily, he is disposed to take advantage of it for what it is worth. But, seeing that our Government have made no secret of their intention to reimpose at an early date some form of control of importation of certain commodities, including dyestuffs, the Commission decided to base their action on the assumption that ndividual importations are liable to be stopped at any moment. That being so, they decided to carry out, with the support of the Board of Trade, a policy of buying on communal lines on behalf of the whole body of colour users, the purchases to be handled by the already existing Central Importing Agency set up by the Board of Trade, and the distribution to be carried out as for the reparation dyes, under the advice of a committee well acquainted with the needs and requirements of each particular section of dye users.

Much as this plan ran counter to the preconceived wishes of the German makers, they were not slow in realising the facts of the situation, and they fell in with the idea as the only practical modus vivendi for quickly re-establishing relations with the British colour users. On these lines they sold to the Commission, for immediate export to this country, dyestuffs amounting to 140 tons, and approximate value of £191,720—a quantity of dyestuffs smaller, it is true, than the amounts the Commission desired to purchase, but apparently all that could be made available at the moment. They also entered into arrangements for the supply of further and larger quantities in the near future, the Commission retaining the option of cancelling the contract in regard to any colours not delivered by the specified date, or in the event of prices rising beyond agreed figures.

Lists of the colours purchased are in course of preparation, and particulars of prices will shortly be made available to colour users.

The Commission have very strongly urged the Board of Trade to expedite the taking up of the balance of reparation dyes, for within occupied areas the surplus stocks can only be released as and when a corresponding quantity of reparation colour is delivered to the Allies. When all is said and done, and when it is realised how crippled is the German production on account of the lack of coal and raw materials, it is a firm conviction among colour users that a well-organised plan of obtaining supplies of dyes not manufactured in this country—whether from Germany, Switzerland or elsewhere—is the best method of dealing with the difficult problem which will face colour users for some considerable time to come.

Colour Users' Association

It is obvious that greater responsibility than ever will now fall upon the Colour Users' Association, and it is essential that that organisation should command the full confidence of the general body of consumers of colour. A small advisory committee of experts has already been working for several weeks, and the result of the visit to Germany is an indication that, with satisfactory executive powers and made thoroughly representative of the users, it can fulfil very valuable functions. The supervision of collective buying and equitable distribution of imported dyes are essential features for meeting the present situation ; but to present the views of the users of colour to the Government Department and to assist in the building up of a valuable colour-making industry in this country will continue to be the principal objects of the Colour Users' Association. The offices of the Association are at Cromwell Buildings, Blackfriars Street, Manchester, and the number of members is steadily increasing.

The Purchasing Commission was constituted as follows :—

Mr. Ernest Bentz, the English Sewing Cotton Company, Manchester ; Mr. C. Rawson, the British Cotton and Wool Dyers' Association, Manchester ; Mr. J. R. Denison, Messrs. J. R. Denison & Co., Bradford; Mr. J. M. Evans, Messrs. J. F. Mellor & Co. (Ltd.) Huddersfield ; Mr. W. W. L. Lishman, the Cornholme Dyeing Company, Todmorden ; Mr. J. W. Bentley, Messrs. S. Barlow & Co. (Ltd.), Castleton ; Mr. A. Hodge, the Calico Printers' Association, Manchester ; Mr. Thorp Whitaker, the Bradford Dyers' Association (Ltd.), Bradford ; Mr. T. Taylor, the Cornholme Chemical Company, Stockport ; Mr. H. K. Gill, Messrs. F. Steiner & Co., Church ; Mr. G. H. Holden, the English Velvet & Colour Dyers, Manchester ; Mr. Ellis Green, chartered accountant, Blackfriars Street, Manchester (secretary).

ββ′-Dichlorethyl Sulphide

In a Paper read before the Chemical Society on Thursday, January 19, Sir William Pope gave an account of his investigations, carried out in conjunction with Professor C. S. Gibson, on the interaction of ethylene and the two chlorides of sulphur.

So long ago as 1860 the English chemist, Guthrie, had obtained an impure dichlorethyl sulphide (known as " mustard gas ") from ethylene and sulphur dichloride, and Sir William Pope described how he had studied and improved the re-action between ethylene and sulphur monochloride, with the result that an almost quantitative yield of mustard gas was obtained. The sulphur simultaneously produced in the reaction was retained in some kind of " pesudo solution," but crystallised out on cooling. The reaction was carried out best at about 60°C. The liquid mustard gas solidified on cooling to crystals which melted at 13·5°. Its density was 1·285 $15°/4°$. It had no action on aluminium, lead, brass, iron, bronze, zinc or tin at the ordinary temperature.

This work, which constituted an important advance on the method used by the Germans, was communicated to the Chemical Warfare Department in reports dated January 30 and February 14, 1918, and was immediately disclosed to the authorities in France and America, by whom the process was at once adopted. It will be remembered that Sir William Pope, in his Presidential Address to the Chemical Society on March 27, 1919, stated that " the available daily production of mustard gas by the Allies was equal to the monthly production of the Central Nations," and that " the cost of the German material was of the order of thirty times as great as that of our product."

The American Nitrogen Products Co. is offering $100,000 of its cumulative, participating, non-redeemable 7 per cent. preferred stock with a par value of $100 a share and exempt from normal Federal income tax. The stock is being offered direct by the company at par with the privilege of arranging for subscriptions on the instalment payment plan. This offering is a part of an authorised issue of $9,250,000, and is for the purpose of adding to present equipment and increasing the capacity of the nitric acid factory of the company. The American Nitrogen Product Co. is a State of Washington corporation engaged in the manufacture of nitrogen products from the air and at present is operating two plants, one producing nitrite of soda and the other nitric acid. The company owns and controls, for the entire Western Hemisphere, valuable processes for the fixation of nitrogen under patents granted by the United States and Canada.

Mr. A. T. L. Allen, of Victoria College, Jersey, has been elected to a scholarship in chemistry of £100 per annum, at Exeter College, Oxford.

Chemical Matters in Parliament

Imports of Potash Compounds from Germany and Alsace

In reply to Sir Richard Cooper (House of Commons, February 23), who asked the President of the Board of Trade the quantity and value of potash compounds, distinguishing those used for agricultural from those used for other industrial purposes, imported from Germany and Alsace since the armistice; the ruling price of potash in Germany; and at what prices German potash compounds have been sold to the English public for industrial purposes, Sir A. Geddes has issued the following answer:—

The approximate quantities and values of potash compounds imported from Germany and Alsace since the armistice for agricultural and industrial purposes respectively are shown in the following statement:—

	Quantity. Tons.	Value. £ c.i.f.
Germany—		
For agricultural use	19,820	323,727
For industrial use	4,301	182,446
Alsace—		
For agricultural use *	37,258	275,476
For industrial use	100	2,250

The ruling prices of potash in Germany according to the Board's present advices are as follows:—

12-15 per cent. potash salts, per 100 kilos, 60 pfennigs per 1 per cent. potash.

20-22 per cent. potash salts, per 100 kilos, 74 pfennigs per 1 per cent. potash.

30 per cent. potash salts, per 100 kilos, 83 pfennigs per 1 per cent. potash.

40-42 per cent. kali magnesia, per 100 kilos, 97 pfennigs per 1 per cent. potash.

80 per cent. muriate, on basis of 60 per cent. K_2O, per 100 kilos, 115 pfennigs per 1 per cent. potash.

Sulphate of potash, per 100 kilos, 152 pfennigs per 1 per cent. potash.

The sale prices of German potash compounds to English consumers for industrial purposes are as follows:—

(*a*) *Material acquired by British Government in Part Payment for Food Stuffs.*

Sulphate 90 per cent., £23. 2s. 6d. per ton bagged material c.i.f.

Muriate 80 per cent., £20 per ton bagged material c.i.f.

Muriate 90 per cent., £21. 10s. per ton bagged on 80 per cent. basis c.i.f.

(*b*) *For Caustic Potash 88-90 per cent. brought in under Arrangements made through the Board of Trade.*

The following maximum prices were fixed for material delivered at consumers' works:—

Up to December 31, 1919, £100 per ton.
From January 1, 1920, £116. 5s. per ton.

(*c*) I am unable to state the prices at which other Geman potash compounds were sold to British purchasers.

Australian Zinc Concentrates

In reply to questions by Major Barnes (House of Commons, February 23) regarding the sum of £650,000 advanced to the Board of Trade under the Treasury Minute of January 3, 1920, for the purpose of zinc concentrates, Sir A. Geddes stated: A contract was entered into during the war between the Government and an association of all Australian producers of zinc concentrates, which provided for the purchase by the former of a certain quantity of Australian concentrates per annum for a period ending ten years after the conclusion of the war. The objects of the agreement were to provide a market for the Australian output which before the war had been controlled by German metal interests under long period contracts, and to promote zinc smelting and important allied industries in the United Kingdom by securing an assured supply of raw material. Owing to the prolonged strike at Broken Hill the concentrates so far required by the Government are stocked there, but so soon as it becomes possible to move them the stocks will be held in this country and will be in the hands of such agents as may be appointed for the purpose until actually sold to smelters. The concentrates will, of course, require to be first roasted and then smelted, in order to produce spelter which is required by the galvanising and brass industries. The Government is at present considering the terms on which the concentrates will be sold to British smelters and any surplus to foreign smelters.

Profiteering Committee on Quinine

In reply to a question by Mr. Glanville (House of Commons, February 23), with reference to an official of the Ministry of Munitions serving on the Profiteering Committee, Mr. Kellaway stated that an official of the Ministry conversant with the dealings in quinine was asked by the Board of Trade to serve on the Committee of Inquiry. No information was withheld so far as the Ministry of Munitions (War Office Contracts Section) was concerned. Further questioned as to whether he had any statement to make as to the quinine transaction conducted by his Department with the British Quinine Corporation, which transaction was adversely criticised in the Board of Trade Profiteering Report, Mr. Kellaway stated that the Report referred to had been published, and he did not think it called for any statement.

Irish Hides Control Order

In reply to questions by Captain Redmond and Mr. Archdale (House of Commons, February 19) regarding the control of Irish hides, Mr. McCurdy stated that all Orders made by the Army Council with regard to Irish hides were cancelled on January 31, when the control of hides was transferred to the Ministry of Food. The distribution of Irish hides was controlled by means of the British Hides (Sales) Order, 1920. This procedure was an essential part of the scheme for the control of live stock and could not be discontinued so long as guaranteed prices for cattle remained in operation.

Benzol Prices

Sir H. Brittain asked the Prime Minister (House of Commons, February 19) whether he was aware that certain purchasers were offering prices for crude benzol 50 per cent. in excess of the standard price fixed by the National Benzol Association, and that this benzol was refined and mixed with paraffin and inferior grade petrol and sold as benzol, the genuine British industry being thereby adversely affected; and would he, therefore, take steps to legalise the interpretation of the commercial use of the word benzol for use as motor spirit so that it was limited to fuel conforming to the standard specification laid down by the National Benzol Association?

Mr. Bridgeman, who replied, stated that he had seen reports to the effect that some purchasers had been offering higher prices for crude benzol than those arranged by the National Benzol Association. The question whether the use of the term "benzol" as a description of certain mixtures is a "false trade description" under the Merchandise Marks Act, 1887, is one for the courts and, as at present advised he was not prepared to recommend legislation on the point.

Supplies of Fertilisers

Mr. Acland asked the Parliamentary Secretary to the Board of Agriculture (House of Commons, February 19) whether, in view of the importance of ensuring the greatest yield of wheat and other cereal crops in the next harvest and of the present world shortage of nitrogenous manures, he would secure the retention in this country, as in recent years, of an adequate supply of sulphate of ammonia at reasonable fixed prices for use in agriculture during the next few months?

Sir A. Boscawen: Under the existing arrangements the export of sulphate of ammonia is prohibited except under licence, and the price at which this material is sold by manufacturers in this country is fixed by agreement between manufacturers and the Ministry of Agriculture and Fisheries. In regard to the future, the question is receiving the very close consideration of the Ministry with a view to securing adequate supplies of sulphate of ammonia and other fertilisers at reasonable prices after the close of the present season.

Nationalisation of Mineral Royalties

In reply to Viscount Wolmer (House of Commons, February 20), who asked the President of the Board of Trade what was going to happen under the Government's proposals in regard to the nationalisation of mineral royalties to the mining engineers and the royalty surveyors of royalty owners; and whether, in the event of their not being retained in employment under conditions as favourable as they now enjoyed they would receive any compensation. Mr. Bridgeman said that he could not anticipate in matters of detail the Government's proposals regarding the acquisition of coal royalties for the State; but the point raised was receiving careful consideration.

* The average potash content of this material is considerably lower than that of the German material.

Catalogues Received

A. C. Wells & Co.

The catalogues cover a wide range of articles, including painting and washing machines, lamps for all purposes, oil feeders, &c., but readers of THE CHEMICAL AGE will be specially interested in the waste oil filter and the patent barrel-pour supplied by this firm. The former is made in various sizes, according to the amount of oil to be dealt with, and the object is to save waste oil by cleaning it for further use. The filter has three compartments. The dirty oil is put into the top one, which contains a floating syphon, through which it is delivered into the second chamber, containing a filtering pad. After being partially cleaned, the oil descends by a tube to a lower filtering pad, through which it is forced, and is finally cleaned and dropped into the bottom chamber, from where it is withdrawn by a tap. The barrel-pour is a device for emptying casks, designed so as to admit of the ingress of air on the discharge of the fluid, thus ensuring an even flow. These apparatus are illustrated and prices are given.—Midland Road, St. Pancras, London, N.W.1.

J.C. Oxley's Dyes and Chemicals, Ltd.

This firm issues a card giving samples of wool died in fine chrome colours, the materials for which the dyes are suitable, methods of dyeing, and the fastness properties.—Dewsbury.

From Week to Week

IT IS STATED that British Glass Industries, Ltd., will control no fewer than 24 different glass concerns in the British Isles.

MR. JOHN GROWDER has left England to take charge of the drilling operations of the Gemsah Oil Reefs, Ltd., at Gemsah.

MR. E. T. MCCARTHY has joined the board of the Ipoh Tin Dredging Co., in the place of Mr. H. D. Griffiths, who has resigned.

AT THE MEETING of the Chemical Society on Thursday, February 19, it was announced that Miss Roscoe had presented to the Society the scientific correspondence of her father, the late Sir Henry Roscoe.

DR. E. H. COOK, who has been elected city analyst for Bath, is an alderman of the Bristol City Council and chairman of the Bristol Education Committee.

G. KERR, of Cumberland, who was seriously burned as the result of an explosion which took place at the chemical works at Kincaid Street, Milton, recently, has died from injuries.

CONTROL OF THE PRICE of hides in New Zealand has been removed and export is now permitted under regulations safeguarding local supplies.

ACCORDING TO ADVICES from The Pas (Manitoba), the International Nickel Co. has purchased the great sulphide of copper mines at Flinflou for $1,000,000.

A MESSAGE from Washingtom states that President Wilson has signed the Oil Land Leasing Bill, which opens up some millions of acres of land in the western part of the country for development.

THE DEATH has occurred of Mr. W. Holmes at his residence in Alston, in his 81st year. Mr. Holmes was a well-known mining agent in Alston district and was closely associated with the lead industry all his life.

HEAVY FLOODS, the worst experienced for 35 years, resulted from the torrential rains which fell at Northwich last week. The navigation of the Weaver by salt and chemical barges was temporarily disorganised.

MR. W. SUTCLIFFE presided at the annual meeting of the Bradford Pharmacists' Association last week when the following officers were elected: President, Mr. F. E. Burdett (M. Rogerson & Sons, Ltd.); Vice-presidents, Messrs. Arthur Smith and L. B. Sutcliffe; treasurer, Mr. W. I. Jolly; hon. secretary, Mr. A. T. Bailes.

THE LECTURE entitled "Some War-time Efforts in Chemical Industry at Gretna," by Mr. J. C. Burnham, C.S.I., arranged to be given before the Fellows of the Chemical Society on March 4, has been unavoidably postponed. The usual ordinary scientific meeting for the reading and discussion of Papers will be held on that day.

THE NEXT ELECTION—the seventh—to Beit fellowships for scientific research will take place on or about July 15. The latest time for receiving applications is April 19. Particulars can be obtained by letter, from the Rector, Imperial College of Science and Technology, South Kensington.

MURPHY & SONS, LTD., 3 & 4, Queen's Square, Leeds, propose to open a Bureau of Bio-Technology at the above address, where they will undertake biological investigation of agricultural and commercia problems, fermentation processes, mycological research, microscopical analysis and micrography. The firm are also erecting a new factory at Nottingham.

THE DEATH IS ANNOUNCED at his residence at South Woodford of Mr. Joseph Barrow, a managing director of Edward Cook & Co., Ltd., soap manufacturers. Mr. Barrow, who was 56 years of age, was previously one of the senior managers for Lever Brothers at Port Sunlight. He was a member of the Society of Chemical Industry.

IN AN ADDRESS on Saturday, February 21, before the Yorkshire Natural Science Association at Keighley, Mr. F. Fairbrother, senior science master at the Leeds Grammar School, said he believed that it was really helpful for teachers and those engaged in chemical research to keep in touch with industrial life. In the past there had been a great lack of sympathy between the industrial scientist on the one hand, and the pure scientist on the other.

AT THE MEETING of the Chemical Society held on Thursday, February 19, it was stated that the following changes in officers and council had been proposed by the Council: As secretary, Dr. H. R. Le Sueur, vice Professor S. Smiles. As vice-presidents, Professor J. B. Cohen and Professor S. Smiles, vice Professor A. Smithells and Professor S. Young. As new ordinary members of Council, Professor A. J. Allmand, Dr. E. F. Armstrong, Mr. F. H. Carr, and Dr. J. T. Hewitt.

MR. S. CURPHEY, Chief Alkali Inspector, Ministry of Health, and Professor J. B. Cohen, F.R.S., Leeds University, are among the members of the Committee appointed by Dr. Addison to consider the present state of the law with regard to the pollution of the air by smoke and other noxious vapours, and to advise what steps are desirable and practicable to diminish the evils still arising from such pollution. A Departmental Committee was appointed by Mr. Herbert Samuel in 1914 to inquire into this subject, and it had made some progress in taking evidence when the war broke out.

MR. A. E. REED, who died on Saturday, February 21, at his residence in Woking, had been a conspicuous figure in the paper trade for the last 50 years. In 1895 he founded the firm which is now Albert E. Reed & Co., Ltd., of 50, Cannon Street, E.C., with mills at Tovil, Maidstone, Horton Kirby, Dartford and Farncombe. Mr. Reed was one of the pioneers in the use of wood pulp for paper-making, and established a large pulp-making industry in Newfoundland.

THE BRITISH SUGAR BEET GROWERS' SOCIETY announces that within the next few months building operations will begin on the Kelham estate at Newark-on-Trent, Nottinghamshire. This estate is about to be transferred from the present owners, the British Sugar Beet Growers' Society, Ltd., to a public company called the Home Grown Sugar, Limited, which has been registered with memorandum and articles of association approved by the Treasury and the Minister of Agriculture.

AN EXPLOSION of gas occurred on Wednesday in the varnishing department of the factory of H. & T. Vaughan, Ltd., lock manufacturers, the Standard Works, Willenhall. It is thought that one of the pilot lights to the gas stoves, in some unaccountable manner, must have been extinguished during the night with the result that a large quantity of gas accumulated in the stove. When one of the employees attended to the stoves the explosion occurred, and practically every bit of glass in the roof and windows was shattered. At the time about 750 employees were engaged upon the premises. Happily, little injury was occasioned.

A MEETING of the London Section of the Institute of Chemistry was held at the Institute on Wednesday, February 18, when a lecture was given by Mr. A. Chaston Chapman on "Yeast." The lecture was fully illustrated with lantern slides, and proved of considerable interest to a crowded meeting. Before the lecture was delivered, Mr. R. L. Collett explained that the committee proposed to institute a "question time" at future meetings so that members who had met with difficulties either in regard to analysis or in regard to the procuring of supplies of apparatus or chemicals, could obtain the assistance of others who had already solved those difficulties.

BRIGADIER-GENERAL F. H. CARLETON, chairman of the Peru Syndicate, Ltd, left London for Peru last week, to investigate and report on the syndicate's potash interests. The syndicate is the British group that has been formed to develop oil, potash and mines in Peru, and great interest is being taken in the Company's shares. General Carleton will be accompanied by Mr. Harry Lomax, the well-known engineer. The company, it is stated, intends, at an early date, to issue one or more subsidiary companies in potash, silver and oil. The success that attended the recent issue has provided the syndicate with a large available banking capital for exploiting its valuable interests in Peru.

IT WILL BE remembered that in November last Sir Alfred Mond, M.P., brought an action for libel against Mr. Harry Macleod Fraser and Mr. Henry Hamilton Beamish, and was awarded £5,000 damages. Mr. Beamish entered an appeal, and in January, on the motion of Mr. P. Hastings, K.C., made on behalf of Sir A. Mond, he was ordered to give security for the costs of the appeal in the sum of £100 within one month. The month expired on Monday, and Mr. Beamish's secretary appeared before Lords Justices Bankes, Atkin and Younger in the House of Lords to ask for an order extending the period within which the security is to be lodged by one month, explaining that Mr. Beamish is now in South Africa. The Court held that they could not entertain the application, and dismissed it.

LARGE-SIZE TENSION TESTS of concrete briquettes were recently made in connection with a reinforced concrete pipeline for the city of Seattle. The briquettes, which were 5 in. square in section, were made of 1 part of local cement, 1·42 parts of sand, and 2·36 parts gravel. Briquettes made of 1 part cement and 3 parts standard Ottawa sand had developed an average strength of about 330 lb. in seven days and 490 lb. in 28 days. The sand and gravel were of first-class quality, clean and carefully graded. The water used averaged 19·5 per cent. by weight. The breaking loads of the concrete briquettes were as follows: Age (in days), 57, 58, 60, 234, 565, 567, 585, 609; Lbs. (per square inch), 333, 268, 278, 378, 480, 430, 445, 492. The modulus of elasticity ranged from 4,772,000 to 5,996,000.

AS ALREADY ANNOUNCED, the Committee appointed by the Board of Trade, under the chairmanship of Mr. H. B. Betterton, M.P., to inquire into non-ferrous mining in the United Kingdom, have completed the taking of evidence, and are preparing a report which they hope to present in a few weeks' time. Among the witnesses recently examined were Colonel J. V. Ramsden and Professor Henry Louis. Colonel Ramsden, representing the Barytes Producers Association and the Shropshire Mines, Ltd., described the steps now being taken to improve the grinding and grading of barytes, and stated that protection against the importation of foreign barytes at low prices was necessary if the industry were to be preserved. Professor Henry Louis gave evidence with regard to mining in Northumberland, Durham and Yorkshire, and suggested that a trial of the Melmerby Scar limestone offered the best chance for a resuscitation of lead mining of that district. He thought that the important effect which a successful issue to this trial would have justified the expenditure of national funds on it.

References to Current Literature

British

ANALYSIS. Determination of the volatile fatty acids by an improved distillation method. J. Reilly and W. J. Hickinbottom. *Proc. Royal Dublin Soc.*, Vol. 15, No. 37, 513-538.

BENZOL. Benzol recovery in France. M. Grebel. *Gas J.*, February 17 and 24, 364-365, 432-433. An account of the processes employed for recovering benzol from gas.

CHARCOAL. Gas adsorption by charcoal. *Engineering*, February 20, 250-251. An account of an interesting paper by H. B. Lemon and K. Blodgett from *Physical Review*.

COAL. Chemistry and coal. The chemist and the coal mining industry. S. R. Illingworth. *Proc. S. Wales Inst. Eng.*, February 12, 255-298. A discourse on the chemistry of coal and allied subjects.

DISTILLATION. On Brown's formula for distillation. S. Young. *Proc. Royal Dublin Soc.*, Vol. 15, No. 47, 667-672. An account of the applicability of F. D. Brown's formula (1879-1881) to mixtures of benzene and toluene.

OILS. Oil-seeds and by-products. *Chem. & Drug.*, February 21, 62-63. A statistical review of imports of oil-seeds, &c., into this country.

REFRACTORIES. The use of fire-clay for laying fire-clay bricks. R. M. Howe. *Gas J.*, February 17, 366-368. A paper read before the Refractories Manufacturers' Association, Chicago, on January 14.

WATER. The self-purification of rivers and streams. A. J. Cooper, E. A. Cooper and J. A. Heward. *Biochem. J.*, Vol. 13, Pt. 4, 345-367. A useful paper for those interested in effluents.

French

ANALYSIS. Reduction of ar matic nitro derivatives by stannous chloride and titanous chloride, and their volumetric determination. D. Florentin and H. Vandenberghe. *Bull. Soc. Chim.*, February 5, 158-166.

Detection and determination of traces of hydrocyanic acid in complex media. L. Chelle. *Ann. Chem. Anal.*, February 15, 48-50. From *Bull. Soc. Pharm. Bordeaux*.

BLAST FURNACES. Comparative study of the performance of electrically heated and coke-fired blast-furnaces. M. Guédras. *Rev. Met.*, January, 13-15.

EXPLOSIVES. Determination of incompletely nitrated phenol in the molten liquors of melinite. M. Marqueyrol and P. Carré. *Bull. Soc. Chim.*, February 5, 127-138, 138-140.

Conversion of dinitrophenol sulphonic acids into picric acid. M. Marqueyrol, P. Carré and P. Loriette. *Bull. Soc. Chim.*, February 5, 140-143.

Preparation of picric acid by the nitric acid process, using different strengths of nitric acid. M. Marqueyrol, P. Carré and P. Loriette. *Bull. Soc. Chim.*, February 5, 143-148.

HEATING. Use of powdered coal for heating copper furnaces. G. de Venancourt. *Rev. Met.*, January, 2-12. An illustrated account of powdered coal-firing as applied to reverberatory and other copper furnaces.

MINERAL OILS. Critical temperature of solution in aniline of the principal hydrocarbons in petroleum spirit. G. Chavanne and L. J. Simon. *Ann. Chim. Anal.*, February 15, 41-43.

RUBBER. Synthetic rubber. A. Mailhe. *Caoutchoue et Gutta-percha*, February 15, 10,181-10,185. An account of the chemical processes involved.

VARNISHES. Melted metallic resinates. P. Nicolardot and C. Coffignier. *Bull. Soc. Chim.*, February 5, 166-172. A research on the resinates of lead, manganese and cobalt.

United States

ANALYSIS. A modification of the Francis-Connell method of determining hydrocyanic acid. P. Menaul and C. T. Dowell. *J. Agric. Res.*, January 15, 447-450.

CYANIDE. A new cyanide. W. S. Landis. *Chem. & Met. Eng.*, February 11, 265-268. An account of the manufacture of a product from cyanamide containing calcium and sodium cyanides and free lime.

ELECTRIC FURNACES. The Rennerfelt electric reverberatory furnace. H. A. de Fries. *Chem. & Met. Eng.*, February 11, 280-281. An illustrated description of the furnace.

IRON ALLOYS. The ferro-alloy industry in 1919. R. J. Anderson. *Eng. & Min. J.*, January 17, 204-208. Interesting account of progress in the industry.

METALLURGY. Review of metallurgy in 1919. *Eng. & Min. J.*, January 17, 189-202. Useful reviews of progress in the following branches: Copper (A. L. Walker), lead (H. O. Hofman), zinc (W. R. Ingalls), gold and silver (P. A. Robbins and H. Hanson), flotation (R. Gahl), ore dressing (E. H. Robie).

PYRIDINE. Recovery of pyridine from by-product coke ovens. F. E. Dodge and F. H. Rhodes. *Chem. & Met. Eng.*, February 11, 274-275. The methods adopted at installations of Kopper's by-product ovens are described.

RESEARCH. Industrial research at the Mellon Institute. W. Savage. *Chem. & Met. Eng.*, February 11, 249-255. An account of the working of Industrial Fellowships, with notes on some of the researches carried out.

WATER. A study of the lime-soda ash water softening process. M. R. Herrle and F. M. Gleason. *Chem. & Met. Eng.*, February 11, 269-272. The effects of varying conditions have been examined.

GLUE. The influence of the method of manufacture on the use of casein in glue making. S. Butterman. *J. Ind. Eng. Chem.*, February, 141-144.

HYDROGEN. Electrolytic production of hydrogen. H. L. Barnitz. *Chem. & Met. Eng.*, February 4, 201-206. The principles and construction of the different commercial cells are described.

JAPAN. The chemical industry and trade of Japan. O. P. Hopkins. *J. Ind. Eng. Chem.*, February, 110-119. An interesting paper replete with statistics.

SMELTING. Problems in electric furnace smelting. F. Holmgren. *Chem. & Met. Eng.*, January 28, 165-172. The best conditions for high efficiency and output have been investigated.

TEXTILES. Testing the mildew resistance of textiles. B. S. Levine and F. P. Veitch. *J. Ind. Eng. Chem.*, February, 139-141. The method devised by the U.S. Bureau of Chemistry is described.

TIN. The use of hydrogenated oils in the manufacture of tin plate. W. D. Collins and W. F. Clarke. *J. Ind. Eng. Chem.*, February, 149-152. Hydrogenated oils have been used successfully in place of palm oil.

WATER-GLASS. A colloidal method for increasing the volume of adhesive water-glass. J. D. Malcolmson. *J. Ind. Eng. Chem.*, February, 174-176. The method depends on the addition of brine.

WELDING. The technical engineer's judgment of the oxy-acetylene process. A. S. Kinsey. *Chem. & Met. Eng.*, February 4, 221-222. The process is pronounced a commercial success.

German

ACETYLENE. Small generators for acetylene Bunsen burners. P. Askenasy. *Z. Elektrochem.*, January 1, 32.

AMMONIA. Oxidation of ammonia. J. Baumann. *Chem. Zeit.*, February 17, 145-146. Calculations of the thermal conditions of the process are given.

ANALYSIS. Estimation of the saponification value of montan wax. H. Salvaterra. *Chem.-Zeit.*, February 12, 129.

Estimation of phosphoric acid as ammonium phosphomolybdate. A. Stutzer. *Landw. Versuchs-Stat.*, November, 251-264.

Differentiation of methyl and ethyl alcohols. T. Sabalitschka. *Pharm. Zentralh.*, February 12, 78-79.

BARIUM. The action of water on barium sulphide. E. Terres and K. Brückner. *Z. Elektrochem.*, January 1, 1-24. A detailed examination of the conditions of formation of barium hydroxide, &c.

CHARCOAL. Combustion of charcoal by means of nitric acid. F. C. G. Müller. *Z. angew. Chem.*, February 10, 40.

CHEMICAL ENGINEERS. The chemical engineer. A. Schmidt. *Chem. Zeit.*, February 14, 137-138. A discussion of the education and qualifications necessary for the profession.

MEDICINES. Review of therapeutic novelties of 1919. S. Rabow. *Chem.-Zeit.*, February 14 and 17, 138-140, 146-147. Continuation of review already noted (THE CHEMICAL AGE, 1920, 207).

PERFUMES. The principles of the chemistry of odorous substances. L. Ruzicka. *Chem.-Zeit.*, February 12, 129-131. Conclusion of paper noted previously. (THE CHEMICAL AGE, 1920, 181.)

STRONTIUM. The action of water on strontium sulphide. E. Terres and K. Brückner. *Z. Elektrochem.*, January 1, 25-32. A detailed study of the reaction has been made.

WOOD. Salt mixtures as a means of protecting wood against fungus and decay. F. Moll. *Z. angew. Chem.*, February 10, 39-40.

Miscellaneous

ANALYSIS. Analytical chemistry of the present day. L. Moser. *Oesterr. Chem.-Zeit.*, January 1 and 15, 1-5, 9-13. An interesting review of modern analytical methods.

Oxydo-potentiometric titration of iodides in presence of chlorides and bromides. I. M. Kolthoff. *Rec. Trav. Chim.*, February 15, 208-214.

CALCIUM HYDRIDE. Some reactions of calcium hydride. S. Reich and H. O. Serpek. *Helv. Chim. Acta*, February 1, 138-144.

CERIUM. The behaviour of cerium carbide towards nitrogen. F. Fichter and C. Schölly. *Helv. Chim. Acta*, February 1, 164-172. The conditions of formation of nitride are described.

CHROMIUM. Chromic chromate. Z. Jovitschitsch. *Helv. Chim. Acta*, February 1, 40-46.

EXPLOSIVES. Researches on modern nitrated blasting explosives. C. F. Van Duin and B. C. R. Van Lennep. *Rec. Trav. Chim.*, February 15, 145-177. A number of highly nitrated benzene and diphenyl derivatives have been prepared and examined.

Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

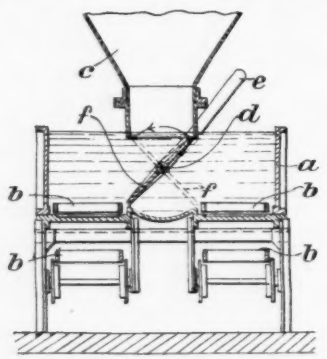
Abstracts of Complete Specifications

124,719. Coke Retorts, Apparatus for Extracting Coke From. A. J. Nerriere, 1, Rue Saint Benoit, Saint Brieux, Cotes du Nord, France. International Convention date (France), March 28, 1918.

A rake-bar for drawing coke from stop-ended retorts is mounted on a carriage which can be raised and lowered on a vertical rail so as to serve several superposed retorts. The vertical rail is carried on a trolley which runs on horizontal rails, towards and away from the retort. The rake-head is pivoted to the ends of longitudinal bars parallel to the rake-bar, and these bars may be operated from outside the retort to hold the rake-head above the charge when inserting it, and to lower it when in position at the inner end of the retort. The two moving carriages may be operated either by hand or mechanically. The coke is discharged into a skip suspended from an overhead rail.

137,928. Conveyors. E. W. Robey, Coventry House, South Place, London, E.C.2. Application date, February 8, 1919.

When material is discharged from a hopper on to a conveyor and it is desirable to exclude air from the hopper, the conveyor is sometimes contained in a water trough, the water in which seals the discharge opening of the hopper. In the event of the conveyor failing to operate, it is usually necessary to withdraw material from the hopper at some point other than the water sealed opening, which necessitates an airtight auxiliary opening and the admission of air when the door is opened. The object is to avoid these disadvantages. The trough *a* is provided with tracks for two conveyors *b*, which are separated as shown.

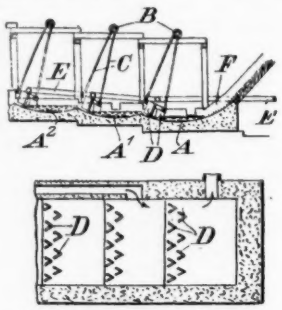


137,928

The mouth of the hopper *c* is sealed by the water, and a plate *f* is pivoted on a shaft *d*, so that it may be turned by a lever *e* to discharge the material on to either of the two conveyors. One of the conveyors may thus be cut out of action when required, and the other brought into use. In a modification, each conveyor may be contained in a separate trough, and the hopper is provided with two corresponding outlets each provided with a closing door so that either may be cut out of action. In another modification, the trough may be built in a furnace setting to receive the discharge from a number of travelling grates, and a pivoted flap may be arranged above the trough to divert the material on to either of the two conveyors.

137,930. Lixiviating and Washing Granular or Pulverulent Ore, Apparatus for. G. Gröndal, Djursholm, Sweden. Application date, February 12, 1919.

The apparatus is for lixiviating and washing material such as copper ore which has been subjected to a chlorinating roasting, and the object is to obtain a continuous process without the use of revolving shafts close to the vats containing acid liquor. A series of vats A, A', A^2, are constructed with the bottoms in the form of cylindrical surfaces whose axes are coincident with the axes of the shafts B. The material is fed into the lowest vat at F, and is fed forward by the feeding devices D towards the next higher vat and so on to the other end of the series. The feeding devices are connected by the arms C to the shafts B, and are slowly reciprocated by the draught-bars E. The angular form of the feeding devices ensures that the material is carried forward by their movement in one direction, and pushed towards the sides by their movement in the opposite direction. The solvent passes through



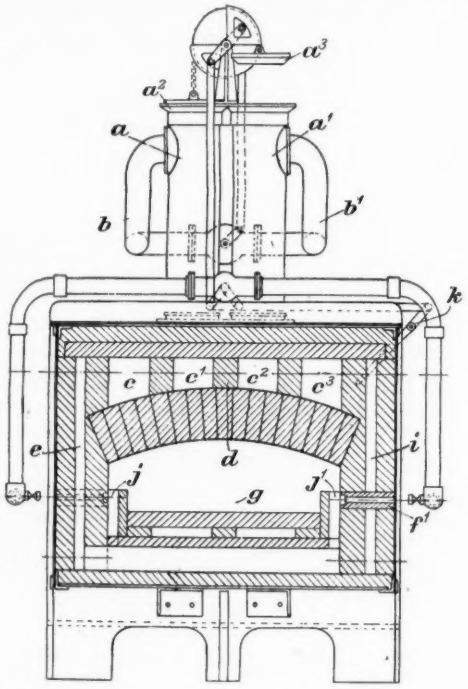
137,930

the series of vats in counter-current. Different solvents may be used in the several vats and also combinations of solvents, by providing suitable inlets and outlets to the vats as shown. In another form, the shafts B are carried by a bar which is reciprocated longitudinally, and the arms C are extended beyond the shafts B and provided with counter weights. When near the end of the forward stroke each arm C comes into contact with a stop and is held back and turned about its pivot till the counter weight falls forward and lifts the feeding device clear of the liquid. The device remains in this position during the backward stroke, at the end of which it strikes another stop and is restored to its working position. This form is suitable with feeding devices of rectangular section.

137,977. Gas-heated Furnaces, Reversible. F. T. Rennison, 99, Psalter Lane, Sheffield. Application date, April 25, 1919.

The furnace is of the type in which the incoming air is preheated by the outgoing products of combustion. The furnace structure carries two flues *a*, *a'*, on the top, each having a removable cover a^2, a^3. The heating chamber *g* is surmounted by flues *c*, *c'*, c^2, c^3, of which *c*, *c'* are connected at one end, and c^2, c^3 are also connected at one end, but the two sets of flues are separated by the central wall *d*. The flues *a*, *a'* are provided with air supply pipes *b*, *b'*, which are fed by a common inlet pipe. Assuming that the cover a^2 is closed, air is drawn into the flue *a* and passes down into the flue *c'* and traverses the length of the furnace to the flue *c*, through which it travels back the length of the furnace and then passes into a flue *e* extending the whole length of the furnace and arranged in its outer wall. The flue *e* is provided with bricks spanning it at intervals in staggered formation to act as baffles for the air. Some of the bricks (corresponding to *f'* on the other side) are provided with internal gas conduits leading to the heating chamber *g*. The air from the flue *e* passes in parallel through a set of transverse flues below the furnace to the vertical passages *j'* where it meets the gas supplied through the passages *f'*. The gas mixture is ignited and utilised in the heating chamber *g*, after which the burnt gases pass down through the passage *j* to another set of transverse flues below the furnace arranged alternately with those already mentioned so that heat is transferred to the air in the latter. The burnt gases then pass upward through the flue *i* to the longitudinal flues

c^2, c^3, and thence through the flue a' to the atmosphere, the cover a^3 being lifted. When desired, the air and burnt gas flues may be interchanged, the two sets of flues being similar.



137,977

The covers a^2, a^3, and the valves controlling the gas and air supplies, are interconnected, and are operated simultaneously by the handle k.

138,002. AMMONIA, MANUFACTURE OF SALTS OF. Amsterdamsche Superfosfaatfabriek, Minervahaven, Amsterdam, Holland. International Convention date (Holland), February 10, 1919.

Ammonia gas is absorbed in an ironcooled absorber by a saturated solution of an ammonium salt, preferably the salt finally required, *e.g.*, ammonium nitrate. Any gas passing from the absorber is absorbed in a column and a scrubber by the circulating solution of the ammonium salt which is returned to the cooled absorber. The saturated ammonium salt passes into a storage tank and thence into a wooden vat where it is neutralised by nitric acid. Part of the neutralised solution is circulated by a pump through a cooler back to the absorbers and the remainder is used as required.

138,003. GAS PRODUCERS, WORKING OF. W. Beswick and N. E. Rambush, Parkfield Works, Stockton-on-Tees. Application date, May 24, 1919.

Water is drawn by a circulating pump from the bottom of a cooling tower packed with coke, and delivered to the water jacket of the producer and also to the water-cooled poker. The hot water from these is passed to the top of the tower and distributed over the packing to meet the air which is delivered into the bottom of the tower by a pump. The ascending air becomes saturated with water vapour, and is then supplied to the producer. The cooled water from the tower may be filtered before returning to the system.

138,046. POLYMERISED COMPOUNDS FROM UNSATURATED HYDROCARBONS, PRODUCTION OF. Hall Motor Fuel, Ltd., Pinner's Hall, Austin Friars, London, E.C.2. (From H. V. Dunham, Brattleboro, Vt., U.S.A.). Application date, September 8, 1919.

Hydrocarbon gases and vapours resulting from the cracking of mineral oil, such as kerosene or petrolite under high pressure, is mixed with about 7 to 8 per cent. of an unsaturated hydrocarbon, such as isoprene. The mixture is passed through a heated container filled with bauxite, fuller's earth, porous clay, or animal or vegetable charcoal, maintained at 110° to 250°C. The polymerisation product is a resin resembling colophony, having the composition $C_nH_{(n2)}$. The molten resin is drawn off at the bottom and cast into moulds as required. The resin is suitable as an insulating compound, or as a component of varnish and various plastic and liquid coating compositions; it may be vulcanised with sulphur and is not attacked by alkalies; it is soluble in alcohol and ether and insoluble in liquid paraffin or olefine hydrocarbons and in water. Reference is directed, in pursuance of Sec. 7, Sub-Sec. 4, of the Patents and Designs Act, 1907, to Specifications 7,282 of 1914, and 109,077.

138,052. DETERGENT COMPOSITION. W. H. D. Newth, 92, Bridge Street, Birkenhead. Application date, October 8, 1919.

The detergent composition consists of borax 8 parts, phenol (carbolic acid) 2 parts, and lime 1 part, mixed with a suitable quantity of water.

International Specifications Not yet Accepted

137,030. FATTY ACIDS. Pardubitzer Fabrik der Akt.-Ges. für Mineralol Industrie, vorm. D. Fanto & Co., Pardubitz, Austria. International Convention date, December 23, 1918. Addition to 131,301.

To accelerate the production of fatty acids from paraffin wax by the process described in No. 131,301, *i.e.*, by passing air for a lengthy period through paraffin wax at 115° to 125°C. (*see* THE CHEMICAL AGE, Vol. I., p. 530), the oxidising current of gas is pre-heated. The gas to be pre-heated may be heated in contact with the reaction mass when it is required to cool the latter, as described in No. 133,027. (*See* THE CHEMICAL AGE, Vol. I., p. 673).

137,034. AMMONIUM PERCHLORATE. L. M. E. Wang, 9 Lokkeveien, Christiania. International Convention date, December 27, 1918.

The process commences with a solution saturated with ammonium perchlorate and sodium sulphate at a temperature below 33°C. The solution is heated to a higher temperature, and equivalent quantities of ammonium sulphate and sodium perchlorate are added, producing a precipitate of sodium sulphate and a saturated solution of ammonium perchlorate. The temperature should be such that the amount of dissolved sodium sulphate in the hot solution bears the same ratio to the amount of water as the corresponding ratio for the initial solution. The precipitated sodium sulphate is filtered and the solution cooled to 33°C. so that an equivalent amount of ammonium perchlorate separates and is filtered off. The mother liquor is then used again. If the ratios are kept as above indicated the starting solution need not be saturated, but the greatest efficiency is obtained when it is saturated. The initial salts may be separately dissolved in separate parts of the initial solution, and the solutions then mixed. The process is applicable to any case in which one reaction product has a solubility which increases with temperature, while the solubility of the other rises to a maximum and then decreases.

137,036. NITROGEN OXIDES. C. Toniolo, Legnano, Italy. International Convention date, December 23, 1918.

Ammonia is oxidised to nitrogen oxides by means of a screen of platinum gauze fixed transversely in a tube. The gases may be pre-heated and the reaction rendered self-supporting by arranging a screen of nickel gauze in front of, and close to, the platinum gauze. The nickel is heated by radiation from the platinum gauze. A similar nickel screen may be placed just behind the platinum screen. The nickel screen also acts as a dust filter, and oxidises catalyst poisons such as hydrocarbons or sulphur in the reacting gases.

LATEST NOTIFICATIONS.

138,862. Electrolysis of Metal Salt, Apparatus for. Eletrokemiske Fabriker Aktieselskabet F.E.F. February 13, 1919.

138,869. Rectifying Apparatus, Condensing Arrangements of. E. Barbet et Fils et Cie. February 8, 1919.

138,871. Evaporation of Liquors, Method for Effecting—and apparatus therefor. Metallbank und Metallurgische Ges. February 27, 1915.

138,900. Bessemerising Iron. R. S. McCaffery. November 13, 1918.
138,905. Coal and other Minerals, Apparatus for Washing. P. Habets and A. France. August 12, 1913.
138,915. Rubber, Treatment of. Hunter Dry Kiln Co. September 25, 1915.
138,924. Zinc Oxide, Treating. New Jersey Zinc Co. August 9, 1918.
138,938. Refrigerating processes and APparatus. C. Delaygue. May 1, 1914.

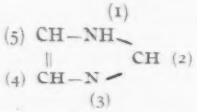
Specifications Accepted, with Date of Application

112,275. Ores, Process and Apparatus for the Treatment of—in the Blast Furnace. L. P. Basset. December 22, 1916. (Addition to 109,452.)
132,795. Bromoacylised Urea Compounds, Manufacture of Derivatives of. Farbenfabriken vorm. F. Bayer & Co. August 9, 1917.
138,137. Antimony Colours, Preparation of. E. F. Morris. October 8, 1918.
138,156. Furnace Gases, Apparatus for Ascertaining the Composition of. F. Cossor. January 23, 1919.
138,207. Stirring-device, Mechanical. G. S. McGown. March 19, 1919.
138,211. Tungstates, Method of Obtaining Pure. J. B. Ekeley and W. B. Stoddard. March 20, 1919.
138,228. Alloy, and Method of Making and Using same. A. G. Mumford, Ltd., and A. G. Mumford. April 14, 1919.
138,272. Electrodes of Electric Furnaces, Material for the Manufacture of. O. R. Olsen. August 6, 1919.
138,291. Alkali Chromates and Iodine, Manufacture or Production of. R. L. Datta. September 23, 1919.

Properties of the Glyoxaline Ring.

At the meeting of the Manchester Section of the Society of Dyers and Colourists held on February 20, Professor F. L. Pyman read a Paper entitled "Some Properties of the Glyoxaline Ring."

Derivatives of the heterocyclic compound, glyoxaline, the author stated, behaved in many respects like the derivatives of benzene, or, more correctly, like aromatic compounds containing phenolic or aminic substituents, glyoxaline having acidic properties by virtue of the amino group and also basic properties due to the tertiary nitrogen atom.



The glyoxaline nucleus occurred in many natural compounds, the most important being histidine, an amino-acid resulting from the cleavage of haemoglobin. There were two general methods for the preparation of glyoxalines; first, the condensation of α-diketones and aldehydes with ammonia, and secondly the condensation of α-aminoketones with thiocyanic acid, yielding 2-thioglyoxalines, from which glyoxalines could be obtained on oxidation. The glyoxaline nucleus was readily substituted by halogens, all the hydrogen atoms being replaceable in this way. On nitration, however, only mononitro derivatives could be prepared, and these contained the nitro group in the 4-position. Glyoxalines coupled with diazonium salts in alkaline solution, yielded arylazoglyoxalines, which had the properties of dyes. Specimens of wool dyed with such compounds were shown by the lecturer. The glyoxaline ring was very stable towards reducing agents, and resisted many oxidising agents. It readily suffered fission, however, under such conditions as (1) on heating a quaternary salt with caustic alkalies, (2) on benzoylation in the presence of alkalies, and (3) on the reduction of its nitroderivatives.

Gretna Explosives Factory

Answering an inquiry by Mr. Lunn (House of Commons, February 25) with regard to the munition factory at Gretna, Mr. Kellaway stated that the total capital expenditure on the building and equipment of the Gretna Green Explosives Factory had been £9,230,143. The working cost had been £14,84 ,697, and the value of the cordite produced £16,690,246. The cost of obtaining this quantity of cordite from America, on whom we were formerly dependent, would have been £26,253,686. A section of the factory was being prepared for, and would soon be working on, the repair of wagons for the Government pool, and certain work in connection with the denaturing of ether was being carried out in the other section; otherwise the work was mainly care and maintenance and disposal of surplus material and plant. It was proposed to retain the factory permanently for the production of propellants.

Dispute Between Chemical Merchants

In the Lord Mayor's Court before the Recorder (Sir Forrest Fulton, K.C.), last week, a claim was made by A. D. Chester & Co., Ltd., chemical manufacturers and merchants, Idol Lane, E.C., against Henry Miller & Co., gum and chemical merchants, Trinity Chambers, Trinity Square, E.C., for the sum of £97. 6s. 4d., the price of Kieselguhr sold and delivered.

In the defence set up it was alleged that the plaintiffs failed to deliver 11 tons of Kieselguhr, and in consequence the defendants sustained damage. A counter-claim was raised for the difference between the contract price of £2. 10s. per ton, and the market price of £9 per ton on 11 tons not delivered, and after deducting such amount from the plaintiffs' claim, paid a sum of £25. 6s. 7d. into the Court in satisfaction of the claim.

It appeared that the plaintiffs had a parcel of 150 tons of Kieselguhr lying at Griffiths Wharf, North Woolwich. A substantial part had been sold and then a fire occurred at the wharf, the material in question being damaged by water. On May 20 a contract was entered into with Henry Miller & Co. for the sale of about 50 or 60 tons of this Kieselghur at £2. 10s. per ton, free delivery to van, cash at buyers' option in 30 days, the material to be free from dirt. Plaintiffs sent a contract note and delivery order. In June plaintiffs received from the wharfingers a note requesting them to remove the goods. Defendants were communicated with and they then asked to be supplied with a delivery order when they would make arrangements to remove the Kieselghur. Deliveries were made and upon information received from the wharfingers, plaintiffs were enabled to send an invoice to the defendants for the quantity delivered, for the price of which the present proceedings were brought. Upon receipt of the invoice defendants wrote saying that the amount charged was noted by them; that the contract was for 50 or 60 tons, and that they would be pleased to settle the account when the contract as to quantity was completed. In the correspondence that ensued, plaintiffs contended that by the conditions of sale, in the event of default being made in payment of any instalment of goods, further deliveries could be suspended or cancelled. The defendants contended there was no breach on their part and that it was a condition precedent to payment for delivery to be made.

The defendant, Mr. Henry Miller, trading as H. Miller & Co., said he traded in gum, chemicals, &c. The contract entered into with the plaintiffs on May 20 was for 50 or 60 tons of damaged Kieselguhr. As soon as the delivery order was received the material was drawn upon and removed as quickly as possible. On July 9 they had drawn 38 tons 18 cwt. 2 qrs. In August, plaintiffs said they were unable to deliver the difference between the 38 odd tons and 50 tons. In June and July, 1919, the market price of the stuff was between £11 and £13 per ton. In those proceedings he was counter-claiming the difference, on the amount undelivered, between the contract price and the price of £9 per ton.

The Recorder in his judgment said it was clear, upon his construction of the contract, that the plaintiffs were to deliver not less than 50 tons, and the defendants were bound to accept not more than 60 tons. There was a failure to deliver a considerable quantity. The defendants estimated their loss on the quantity not delivered by taking the price of the material at £9 per ton. He thought it much safer to put the price at £4 per ton and not £9 per ton, as the defendants had done. Upon that state of affairs the defendants made an insufficient payment into Court. There would be judgment for the plaintiffs on the claim for £97. 6s. 4d., and for the defendants on the counter-claim for £45. The costs would be settled on taxation.

The Affairs of G. E. E. Newton

George Edward Ellis Newton, wholesale chemist, 74, Great Tower-street, E.C., attended at the London Bankruptcy Court on February 20 for public examination under the receiving order recently made against his estate on the petition of a moneylender. A statement of his affairs showed gross liabilities £6,793, of which £2,030 was expected to rank for dividend, against assets £8. 1s. 1d. Nearly all the liabilities were for money lent. The debtor, who had traded as Newton & Co., attributed his failure to loss of business through shipping restrictions and Government control of chemicals, and to stagnation of trade following the armistice. The Official Receiver requiring further time to investigate the debtor's affairs, his Honour adjourned the examination to March 26.

Recent Wills

Mr. A. Blackburn, of Moseley, chemist and druggist (net personalty), £4,109 ... ... £4,226
Mr. W. H. Collier, of Hole, chairman of Manchester Oil Seed Crushers, Ltd., &c. (Net personality, £31,097) £31,340
Lieut.-Col. G. M. Gregory, V.D., of W. Kensington, formerly superintendent of the Opium Factory at Ghazipur ... ... £648.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, February 26.

Home trade demand for chemicals of all descriptions continues unabated, and it is difficult to find a weak spot in the market. The continual shrinkage in available supplies naturally restricts the business it is possible to conclude, and many consumers are to-day living on a hand-to-mouth basis. As regards export, the position is steadily becoming worse. The market is inundated with inquiries and orders which are impossible to fulfil.

The restriction in imports from America is now making itself felt, but values have now about readjusted themselves to the recent decline in the exchange. Imports from the Continent show a slight increase, but are not of sufficient value to bring any appreciable relief to this market, except in one or two products.

General Chemicals

ACETONE continues in better demand, but price is unchanged.

ACID ACETIC.—The position remains exceedingly firm, and foreign makers have advanced their price, and there are indications of still further advances. Meantime, inquiry remains active and all the available supplies are very quickly absorbed.

ACID CARBOLIC is in short supply and price is slightly firmer.

ACID CITRIC is practically unobtainable on the spot, and re-sale parcels are commanding higher prices. Arrivals are only coming in inadequate quantities.

ACID FORMIC continues in good demand and is firmly held at recent quotations.

ACID OXALIC is in short supply. Small parcels only are coming on to the market, and these are immediately absorbed at recent quoted prices. The parity on the Continent now appears to be higher than that ruling on the English market.

ACID TARTARIC is an interesting market, and is very firm for both spot and forward delivery. There are some heavy orders in the market on export account.

ALUM is without change in price, but makers are very heavily sold.

AMMONIUM SALTS are all in active request and prices are extremely firm. Further advances are indicated for several products, and for a number of salts makers are unable to give delivery for several months ahead.

ARSENIC has again increased in value and is in extremely short supply. A further advance would appear to be imminent.

BARIUM SALTS are in moderate request. Chloride is about as it was, while there is a good demand for sulphate.

BLEACHING POWDER is in active request, but little business is possible, as there are practically no supplies obtainable. The nominal price is without change.

COPPER SULPHATE is without change in value, and it is possible to secure re-sale parcels at slightly under makers' quotations.

CREAM OF TARTAR continues in sellers' favour, and is a shade firmer on the week.

FORMALDEHYDE.—There is no change in the nominal quotation, but spot supplies are practically unobtainable, and shipments and arrivals are now getting considerably in arrear. Forward quotations from America show a still further advance.

IRON SULPHATE (GREEN COPPERAS) is without change and is moving off fairly well.

LEAD SALTS are all in good demand. Acetate is very firm, and there are a number of buyers in the market anxious to cover their forward requirements at present levels. Makers, however, are not by any means anxious to sell, in view of the prevailing uncertainty as to the values of raw materials.

LITHOPONE is now becoming practically unobtainable. The Continental makers seem to be out of the market, while American sellers hold firmly to their price.

MAGNESIUM SALTS are all in good demand without change in value.

POTASSIUM BICHROMATE is in request, and premiums are being paid for spot parcels on makers' prices.

POTASSIUM NITRATE is in good request and price is without change.

POTASSIUM PERMANGANATE is slightly higher in price, and more recent arrivals have been readily absorbed. This article would appear to be becoming more scarce.

POTASSIUM PRUSSIATE is relatively cheap, and, as Continental quotations are now equal to the prices ruling in this country, it would not be surprising to see this market take a step forward in the near future.

SODIUM ACETATE.—The recent advance is fully maintained, and supplies are becoming scarcer.

SODIUM BICHROMATE continues very scarce, and a still larger premium is being offered for early delivery.

SODIUM CAUSTIC is again firmer on the week, and any re-sale parcels appearing on the market are quickly absorbed.

SODIUM HYPOSULPHATE.—Makers are all fully sold, and the article is scarce and inclined to be firmer.

SODIUM NITRITE is becoming increasingly difficult to obtain and is again higher.

SODIUM PRUSSIATE is scarcer than ever. The recent advance is fully maintained, and the quotations can only be regarded as nominal. Makers appear to be fully sold for months.

SULPHUR is becoming an interesting market. Quotations from Sicily are very firm, and it is understood that the Government stocks have now been disposed of.

Coal Tar Intermediates

This market is practically without change, and values all round continue extremely firm. Deliveries of many products can only be made intermittently.

ACETANILIDE is wanted, and a further advance is quite likely, as forward quotations from America are again higher, while early delivery cannot be obtained.

BENZALDEHYDE is about as it was, and small supplies can be obtained for prompt delivery.

BETA NAPHTHOL is without change and the position is as stringent as ever. Makers are doing their best to catch up with arrears under great difficulties.

DINITROCHLORBENZOL is moving off well at recent quoted prices.

H. ACID is becoming exceedingly difficult to obtain, but price is nominally without change.

NAPHTHIONATE OF SODA is almost impossible to obtain for near delivery.

PARANITRANILINE is without nominal change, but it is practically impossible to secure any supplies for near delivery.

PARANITRAPHENOL is in request, and is higher in price in sympathy with the advance in value of the raw materials.

RESORCIN.—Small quantities of technical quality have come on the market recently, but have been quickly absorbed.

SALICYLIC ACID continues in request and price is extremely firm.

Coal Tar Products

Prices remain very firm, and supplies are somewhat scarce.

90's BENZOL remains at 2s. 7½d. f.o.r. makers' works.

CRESYLIC ACID.—Supplies are still scarce, and the price is now 4s. on rails for Pale 97/99 per cent., and 3s. 6d. for Dark 95/97 per cent.

CREOSOTE OIL.—The price is from 10½d. to 11d. in the North, and 11d. to 11½d. in the South.

SOLVENT NAPHTHA.—Can be bought in the region of 3s. 4d. on rails at makers' works.

HEAVY NAPHTHA.—The price is also 3s. 4d.

NAPHTHALENE is stiffening and the price is about £24 for Refined, and the Crude is worth from £8 to £10.

PITCH.—The demand remains strong and prices still have an upward tendency. It is reported that 125s. has been paid f.o.b. London, and makers on the East Coast are asking 120s. f.o.r.

Sulphate of Ammonia

The demand for Home trade remains satisfactory, and in consequence of the mild weather farmers have been able to put large quantities on the land. The demand for export remains good and prices have further advanced. Business has been reported at £43 to £50 f.o.b. U.K. port in double bags.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	3	3	to	0	3	6
Acetone oil	ton	77	0	0	to	80	0	0
Acetone, pure	ton	90	0	0	to	95	0	0
Acid, Acetic, glacial, 99-100%	ton	105	0	0	to	110	0	0
Acetic, 80% pure	ton	82	0	0	to	85	0	0
Arsenic	ton	95	0	0	to	97	10	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	3	to	0	1	3½

	per	£	s.	d.		£	s.	d.
Acid, Citric	lb.	0	5	3	to	0	5	6
Formic, 80%	ton	110	0	0	to	115	0	0
Gallic, pure	lb.	0	7	3	to	0	7	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	65	0	0	to	70	0	0
Lactic, 60 vol.	ton	80	0	0	to	85	0	0
Nitric, 80 Tw.	ton	37	0	0	to	39	0	0
Oxalic	lb.	0	2	3	to	0	2	5
Phosphoric, 1.5	ton	50	0	0	to	52	10	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	3	0	to	0	3	3
Salicylic, B.P.	lb.	0	3	9	to	0	4	0
Sulphuric, 92-93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	3	8	to	0	3	9
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	15	0	0	to	15	10	0
Aluminium, sulphate, 17-18%	ton	18	10	0	to	19	0	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	32	10	0	to	37	10	0
Ammonia, .920	ton	20	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	80	0	0	to	85	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	48	0	0	to	55	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl, acetate	ton	360	0	0	to	370	0	0
Arsenic, white, powdered	ton	95	0	0	to	97	10	0
Barium, carbonate	ton	13	10	0	to	14	10	0
Barium, carbonate, 92- 4%	ton	14	10	0	to	15	0	0
Chlorate	lb.	0	1	4	to	0	1	5
Chloride	ton	25	0	0	to	26	10	0
Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	18	0	0	to	18	10	0
Borax crystals	ton	41	0	0	to	42	0	0
Calcium acetate, grey	ton	32	0	0	to	37	0	0
Carbide	ton	28	0	0	to	30	0	0
Chloride	ton	9	0	0	to	9	10	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	0	to	0	1	2
Cobalt acetate	lb.	0	7	0	to	0	7	6
Oxide, black	lb.	0	7	9	to	0	8	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	50	0	0	to	52	0	0
Cream Tartar, 98-100%	ton	300	0	0	to	305	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	310	0	0	to	315	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	3	15	0	to	4	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	40	0	0	to	42	0	0
Iron sulphate (Copperas)	ton	4	10	0	to	4	15	0
Lead acetate, white	ton	105	0	0	to	110	0	0
Carbonate (White Lead)	ton	75	0	0	to	78	0	0
Nitrate	ton	80	0	0	to	85	0	0
Litharge	ton	69	0	0	to	71	0	0
Lithophone, 30%	ton	52	0	0	to	55	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	13	0	0	to	13	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel ammonium sulphate, single salt	ton	47	10	0	to	52	10	0
Potassium bichromate	lb.	0	1	10	to	0	2	0
Carbonate, 90%	ton	102	0	0	to	105	0	0
Chloride	ton	Nominal.						
Potassium Chlorate	lb.	0	1	1	to	0	1	2
Meta-bisulphite, 50-52%	ton	250	0	0	to	260	0	0
Nitrate, refined	ton	68	0	0	to	70	0	0
Permanganate	lb.	0	5	6	to	0	5	9
Prussiate, red	lb.	0	6	0	to	0	6	3
Prussiate, yellow	lb.	0	2	2	to	0	2	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	4	15	0	to		—	
Seconds	cwt.	4	10	0	to		—	
Sodium acetate	ton	57	0	0	to	60	0	0
Arsenate, 45%	ton	52	0	0	to	54	0	0
Bicarbonate	ton	10	10	0	to	11	0	0

	per	£	s.	d.		£	s.	d.
Sodium, Bichromate	lb.	0	1	5	to	0	1	7
Bisulphite, 60-62%	ton	32	10	0	to	33	10	0
Chlorate	lb.	0	0	5¾	to	0	0	6¼
Caustic, 70%	ton	36	0	0	to	38	0	0
Caustic, 76%	ton	37	0	0	to	38	0	0
Hydrosulphite, powder, 85%	lb.	0	3	6	to	0	3	9
Hyposulphite, commercial	ton	23	10	0	to	25	10	0
Nitrite, 96-98%	ton	77	10	0	to	82	10	0
Phosphate, crystal	ton	38	0	0	to	40	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	10	to	0	1	11
Sulphide, crystals	ton	18	10	0	to	19	10	0
Sulphide, solid, 60-62%	ton	36	10	0	to	38	10	0
Sulphite, cryst.	ton	12	10	0	to	13	10	0
Strontium, carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	85	0	0	to	90	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	25	0	0	to	27	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	6	to	0	3	7
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	2	9	to	0	3	0
Protochloride (tin crystals)	lb.	0	2	4	to	0	2	6
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	50	0	0	to	52	10	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	75	10	0
Dust, 90%	ton	77	10	0	to	80	0	0
Sulphate	ton	22	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	6	to	0	3	9
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	3	6	to	0	3	9
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	0
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	6	to	0	6	0
Benzoate of soda	lb.	0	5	6	to	0	6	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	4	3	to	0	4	6
Betanaphthylamine, technical	lb.	0	7	6	to	0	8	6
Croceine Acid, 100% basis	lb.	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	4	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	4	to	0	1	5
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	3	to	0	3	6
Dimethylaniline	lb.	0	4	9	to	0	5	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	13	6	to	0	14	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	3	to	0	5	6
Naphthionate of Soda	lb.	0	5	6	to	0	6	0
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	2	to	0	1	4
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	8	to	0	1	10
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb.	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	7	0	to	0	7	6
Paranitrophenol	lb.	0	2	0	to	0	2	2
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	0	to	0	14	0
Paratoluidine	lb.	0	7	6	to	0	8	6
Phthalic anhydride	lb.	0	9	0	to	0	10	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	5	to	0	1	6
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Company News

BORAX CONSOLIDATED.—The directors recommend a dividend of 2s. per share on the deferred ordinary shares, less income tax, making 15 per cent. for the year.

MOLASSINE CO.—The directors recommend that the arrears of £21,000 dividends on the preference shares be satisfied by the issue of 7 per cent. cumulative preference shares.

ELLIOTT'S METAL.—An interim dividend at the rate of 10 per cent. per annum (1s. per share), less tax, has been declared on ordinary shares for the half-year, payable March 1. Last year the dividend was the same.

JOSEPH CROSFIELD & SONS (WARRINGTON).—The profit and loss account for the year ended November 30 last shows a credit balance of £10,410, after charging repairs, renewals and alterations, depreciation, insurance, and excess profits duty, and providing for dividends on the preference shares and bonus and dividend on the ordinary shares. It is proposed to carry the whole amount to the reserve fund.

SUN FUEL.—It is proposed to increase the capital to £500,000 by the creation of 250,000 additional shares of £1 each. The company has recently completed negotiations for the purchase of the Atlantic Patent Fuel Co., Ltd., of Swansea, on very favourable terms, which the directors are of the opinion will greatly strengthen the position of the company and make it one of the largest and most important patent fuel companies in the United Kingdom. Full particulars will be given at a meeting of the Company on March 1.

BRITON FERRY CHEMICAL.—The gross profit amounts to £21,584, which, added to £1,972 brought in, makes £23,556, out of which has been paid an interim dividend of 1s. 6d. per share on the fully paid ordinary shares and of 4½d. per share on the partly paid ordinary shares; £5,000 has been transferred to the chambers and columns renewal account. A dividend of 2s. 6d. per share is recommended on the fully paid ordinary and 7½d. per share on the partly paid ordinary. A year ago a similar distribution was made.

TRANSVAAL OIL SHARE SYNDICATE.—A circular dated February 10 states that the company has entered into an agreement with the British Guiana Trading Co., Ltd., under which it acquires an interest in certain exploration licenses in British Guiana, and also has agreed to carry out certain exploration work, and to continue, if thought advisable, the borings which have been made on the properties. The company has also acquired an option over two bauxite leases in the same colony. Bauxite is an impure aluminium hydroxide, used for making aluminium.

CASTNER-KELLNER & BRUNNER MOND.—The proposed exchange of shares between these two companies, whereby Brunner Mond offered to exchange two £1 ordinary shares for the ordinary £1 share in Castner-Kellner (*see* THE CHEMICAL AGE, January 17, p. 80), has been ratified. Shareholders owning over 85 per cent. of the shares of the latter company, exclusive of the 250,000 ordinary shares already held by Brunner Mond, have accepted. The original offer was made subject to acceptance by holders of at least 75 per cent. of the ordinary shares in Castner-Kellner.

DEEBROOK DREDGING.—The report for the year to May 31 last states that the net proceeds (after paying royalty, smelting charges, &c.), together with sundry receipts, amounted to £24,992. During the period under review the company received £3,500 in dividends on its holding on Ronpibon Extended N.L. shares, and £3,250 towards liquidation of the advances made to that company, which, with a payment of £1,000 received since June 1 last, now stands at £1,253. Dividends amounting to 4s. per share have been paid, and a further 1s. per share has been distributed during the current year.

ANGLO-CONTINENTAL GUANO WORKS.—At an extraordinary general meeting held in London on Wednesday the following resolutions were passed: "That the capital of the company be increased from £400,000, divided into 200,000 7½ per cent. cumulative preference shares of £1 each and 2,000,000 ordinary shares of 2s. each, to £700,000 by the creation of an additional 100,000 preference shares of £1 each and 2,000,000 ordinary shares of 2s. each." "That the said new preference shares shall rank *pari passu* in all respects with the existing preference shares, and that the said new ordinary shares shall ran, *pari passu* in all respects with the existing ordinary shares."

SOUTH WALES FUEL CO.—A limited company has been formed under this title to purchase, extend and develop the business of manufacturers of ovoid briquettes and patent fuels hitherto carried on at King's Dock, Swansea, by the Swansea Fuel Co., Ltd. It is stated that the business is a proved going concern, producing and selling briquettes on a profitable scale. The present output capacity of the plant is 120,000 tons per annum. The company has an authorised capital of £125,000. The present issue consists of 120,000 7½ per cent. (free of income tax up to 6s. in the £) cumulative participating preference shares of £1 each, participating as to 25 per cent. of all further profits available for distribution, of which 95,000 shares are offered at par.

SHELTON IRON, STEEL & COAL.—Negotiations have taken place between some of the large shareholders and John Summers & Sons, Ltd., which have resulted in the acquisition by the latter of the majority of the Shelton shares. The price is £1. 5s. per share, payable as to £1 in 7½ per cent. cumulative preference shares of John Summers & Sons, Ltd., and 5s. in cash. Arrangements have been made by which similar terms will be offered in due course to the whole of the Shelton shareholders. The preference shares of John Summers & Sons, Ltd., will carry dividend from January 1, 1920, and the dividend upon the Shelton shares to December 31, 1919, about to be declared, will be retained by the vendors.

INTERNATIONAL PETROLEUM.—The board of the International Petroleum Co., Ltd., (incorporated in Canada) have resolved to issue 1,353,401 shares of £1 each, par value $5, of the common capital stock at the price of $5 per share payable in New York funds at par. The issue will be made on the basis of share for share of the preference and common capital stock issued and fully-paid up as at the close of business on March 5, and each shareholder is entitled to subscribe and pay for one new common share in respect of each share held by him. Holders of bearer share warrants, resident in the United Kingdom, who present their warrants at the office of the Farmers' Loan & Trust Co., 26, Old Broad Street, London, E.C., on or before March 15, are entitled to subscribe and pay for new shares on the terms mentioned above.

WILLESDEN GLASS.—On Monday the shares of the Willesden Glass Co. were introduced to the Stock Exchange, the ordinary being quoted at 12s. 6d. and the preference at 22s. 6d. The capital is £100,000, divided into £88,364 in 7 per cent. cumulative participating preference shares of £1 each and £13,636 in 136,360 ordinary shares of 2s. each, all of which has been subscribed and issued. In addition to the fixed dividend of 7 per cent. the preference shares are entitled to 20 per cent. of the surplus net profits which the board may recommend for distribution in respect of each year and upon the winding up to a priority in return of capital, and payment of any arrears of the preferential dividend, and a further right to 20 per cent. of any surplus assets available for distribution on winding up. The ordinary shares are entitled to the remaining 80 per cent. of the surplus profits and of the surplus assets on a winding up. The company owns freehold works at Willesden, with railway sidings and canal frontage, and there is ample room for extension. The capacity of the present producing plant is approximately 10,000,000 sq. ft. per annum. The Willesden Glass Co. owns the only producing sheet-glass factory in the South of England. The company has larger orders than it can cope with, and it is expected that profits will be earned sufficient, on a moderate estimate, to pay 15 per cent. to 20 per cent. on the preference capital and 3s. to 4s. on the ordinary shares.

Lord Leverhulme's Offer to John Knight, Ltd.

SINCE the report the board of John Knight, Ltd., have been approached by Lord Leverhulme with an offer which appears to them to be in the interests of the shareholders. They have accordingly entered into a provisional contract with Lord Leverhulme embodying the proposals made, as follows:—

1. The ordinary shares of the company of £1 each, which at present rank *pari passu* in a winding-up with the deferred shares and have no priority in capital, are to be converted into preferred ordinary shares carrying a fixed cumulative preferential dividend of 25 per cent. per annum as from December 1, 1919, together with priority both as regards capital and any arrears of dividend in a winding-up.

2. Lord Leverhulme will purchase all the deferred shares of £1 each at £13 10s. per share payable in cash on or before May 1, 1920, together with interest at 7 per cent. per annum from December 1, 1919.

3. The voting power of the company is to be altered by giving 10 votes per share to the deferred shareholders as against one vote per share for the preferred ordinary shareholders. The effect of this will be to give a majority of votes to the holders of deferred shares.

John Knight, Ltd., will preserve its identity, and it is the intention that the business shall be carried on in accordance with the traditions of the company. The board of John Knight, Ltd., recommend the shareholders to take advantage of this offer and direct the attention of the deferred shareholders to the conditions, which state that the offer to purchase their shares must be accepted not later than March 9 next, and that Lord Leverhulme can cancel the offer, if acceptances are not received by then, for at least 90 per cent. of the deferred shares of the company, and if the requisite alterations of the articles of the company are not subsequently sanctioned by the shareholders.

Nigeria and Tarkwa Mines

IN the Companies' Winding-up Court of the Chancery Division on Tuesday, Mr. Justice P. O. Lawrence had again before him the petition of the Economic Discount Co., Ltd., for the compulsory winding-up of the Nigeria & Tarkwa Mines, Ltd. Counsel said that petitioners had that morning received a cheque for £20, and on the assumption that the cheque would be honoured, and on the promise of a further £20 within the period, he (counsel) was willing to allow the petition to stand for another fortnight.

His Lordship agreed.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Applications for Debtors' Discharge

DUKE, JOSEPH ALGERNON HARE, 61 and 62, Gracechurch Street, London, trading in partnership with Henry Slater, and described in the Receiving Order as Perry Mills & Co., April 20, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C. 2.

SLATER, HENRY, 61 and 62, Gracechurch Street, London, trading in partnership with Joseph Algernon Hare Duke, and described in the Receiving Order as Perry Mills & Co., April 27, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C. 2.

SCOTT, WILLIAM ROBERT, residing and trading at 139, Denton Street, Carlisle, chemist, April 9, 11 a.m., Court House, Carlisle.

Liquidators' Notices

NETTLE'S PHARMACY, LTD.—A general meeting of members will be held at the offices of Trewren & Peter, 22, Basinghall Street, E.C. 2, on Monday, March 22, at 3 p.m. W. J. Peter, Liquidator.

WEST HARTLEPOOL CHEMICAL MANURE CO., LTD.—A general meeting of members will be held at the offices of Turnbull & Tilly, Solicitors, 13, Church Street, West Hartlepool, on Wednesday, March 24, at 11 a.m. E. Heslop, Liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of* 1908, *provides that every Mortgage or Charge, as described therein, created after July* 1, 1908, *shall be registered within* 21 *days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July* 1, 1908, *require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

BRITISH EVERITE & ASBESTILITE WORKS, LTD., MANCHESTER. Reg. February 14. £5,000 debentures, part of £30,000; general charge. *£300. December 19, 1918.

BRITISH HYGIENIC SOAPS, LTD., LONDON, E.C.—Reg. February 16. £495 debentures, to E. Zevallos, 66, Talgarth Mansions, W., and others; general charge. *Nil. December 31, 1918.

ESSONA PERFUMERY CO., LTD., WIMBLEDON.—Reg. February 14. £50 debentures, part of £500; general charge. *Nil. December 31, 1918.

LOW TEMPERATURE CARBONISATION, LTD., LONDON, S.W.—Reg. February 13 (by order on terms). £70,000, including £30,000 previously advanced to London County Westminster & Parr's Bank, Ltd.; charged on certain debentures stock, shares and uncalled capital, &c. *——. December 31, 1918.

Bill of Sale

[*The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of* 1882 *and under the Act of* 1878. *Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.*]

ANDERSON, GEORGE, 52, Norwood Road, Birkby, Huddersfield, works chemist. Filed February 21. £40.

County Court Judgments

NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

WYLIE, R. T., 7, High Street, High Wycombe, chemist. £10. 3s. January 14.

LAWRENCE, Mr., 32, Plumstead Road, Woolwich, chemist. £10. 11s. January 16.

PARISH, J. E., 361, High Street, Rochester, chemist. £16. 3s. 2d. January 15.

BARHAM, JOSEPH, 72, Emanuel Road, Balham, chemist. £20. 8s. 2d. January 14.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116, and 117, Chancery Lane, London, W.C.:—

"BESVET," LTD., 37, Station Street, Nottingham.—Chemists and druggists. Nominal Capital, £100 in 100 shares of £1 each. Directors: Sir J. Boot, Bart., St. Heliers, The Park, Nottingham; A. L. Milne, 7, Gedling Grove, Nottingham. Qualification of Directors, 1 share.

BLOOMDALE CHINA CLAY CO., LTD.—China clay producers and merchants. Nominal Capital, £40,000 in 40,000 shares of £1 each. Directors: W. E. S. Taylor, 138, Colney Hatch Lane, Muswell Hill, N.10 Qualification of Directors, 200 shares. Remuneration of Directors, £100 each; Chairman, £150.

BOOT'S BRITISH FINE CHEMICALS, LTD., 37, Station Street, Nottingham.—To manufacture chemicals. Nominal Capital, £125,000 in 125,000 shares of £1 each. Directors: Sir Jesse Boot, Bart., St. Heliers, The Park, Nottingham (Governing Director); J. C. Boot. Qualification of Directors, £1.

BRADING CEMENT CO., LTD., Brading, Isle of Wight.—Cement makers and sellers. Nominal Capital, £30,000 in 30,000 shares of £1 each. Directors: J. G. Chapman, The Oaks, 9, Beech Grove, Harrogate; G. W. Fletcher, Cherry Bank, Ilkley, York. Qualification of Directors, £100.

GLYNN CO., LTD., 44, North Parade, Halifax, York.—Wholesale and manufacturing chemists. Nominal Capital, £20,000 in 20,000 shares of £1 each. Directors: Albert Field, 31, Birlington Road, West Hampstead, N.W.6; Arthur Field, 1, Akroyd Place, North Parade, Halifax; A. R. Field, 73, No th Parade, Halifax. Qualification of Directors, £500.

HARROGATE TABLET CO., LTD., 9, Leeds Road, Harrogate.—Chemists, druggists and drysalters. Nominal Capital, £5,000 in 5,000 shares of £1 each. Directors: A. Mortimer, 9, Leeds Road, Harrogate; W. S. Nelson, 25, West End Avenue, Harrogate. Qualification of Directors, 10 shares.

LONDON MICA & GENERAL SUPPLY CO., LTD., 351, Upper Street, Islington, N.1.—Mica and general merchants. Nominal Capital, £1,000 in 1,000 shares of £1 each. Directors: S. Grout, 13, St. Helen's Park Road, Hastings; F. A. Smith, 6, Beatrice Road, Walthamstow; W. Beaumont, Ferniehill, Blatchington Road, Tunbridge Wells. Qualification of Directors, £10.

OILFIELDS OF EGYPT, LTD., 5, Bishopsgate, E.C.2.—To acquire and develop petroleum and oil-bearing lands. Nominal Capital, £750,000 in 750,000 shares of £1 each. Minim m subscription, 7 shares. Directors to be appointed by subscribers. Qualification of Directors, £250. Remuneration of Directors, £500 each.

REDFORD (B.), LTD., 9, Progress Buildings, Cheetham Hill Road, Manchester.—Wholesale and retail chemists and druggists. Nominal Capital, £2,000 in 2,000 shares of £1 each. Directors: B. Rechler, "Norwood," 240, Plymouth Grove, Chorlton-on-Medlock; Bella Redford, "Noorwood," 240, Plymouth Grove, Chorlton-on-Medlock. Qualification of Directors, £50.

WHITEHEAD (W. R.) & CO., LTD.—Oil and colourmen and drysalters. Nominal Capital, £10,000 in 10,000 shares of £1 each. Directors: W. E. Brown, Mowbray House, Ellesmere Park, Eccles, Lancashire; J. H. Herriman, Percy House, Devonshire Road, Pendleton, Lancashire; V. L. Lane, 40, Highfield Road Chorlton-cum-Hardy. Qualification of Directors, £10.

Chemical Workers' Wages

THE question of chemical workers' wages has been before the Chemical Joint Industrial Council on a demand submitted by the workers' representatives for an increase to 1s. 6d. per hour for day workers, and 1s. 8d. per hour for shift workers. To meet this claim the employers offered 1s. 5d. and 1s. 7d., subject to the adoption of a sliding scale based on the cost of living. The men's representatives, however, announced that, after going fully into the figures as represented by the present high cost of living, they could not depart from the original demand, offering the strongest objection to the principle of a sliding scale, and urging that so important a matter as standardisation, which was the real issue, should be dealt with without any qualifications. No agreement was, therefore, reached. The districts affected are Tyneside, Teeside, Yorkshire, Lancashire, the Midlands, and West of England, and the salt-producing areas. The employers at the conference submitted a long memorandum dealing with the three main problems of the chemical trade, and offering a minima of 47s. 6d. per week for day labourers, and 72s. 2d. for shiftmen. With the scheme an undertaking was given not to lower these rates even if the cost of living fell to pre-war standard. The proposed rates would give the following rates per week: Day labourers, Tyneside, £3,7s. 3d.; Teeside, Yorkshire and Lancashire, £3. 4s. 4d.; Midlands and South of England, £3. 6d. 4d.; West of England and North Wales, £3. 5s. 10d.; salt district, £3. 2s. 5d.; shiftmen, Tyneside, £4. 13s. 8d.; Teeside, £4. 11s. 5d.; Yorkshire, £4. 14s. 5d.; Lancashire, £4. 14s.; Midlands and South of England, £4. 16s. 6d.; West of England and North Wales, £4. 11s. 5d.; salt district, £4. 12s. 8d. The matter will now go to arbitration.

Chemical Trade Inquiries

Locality of Firm or Agent.	Materials.	Ref. No.
Canada (Winnipeg)	Castile Soap	—
(Toronto) ...	Fuller's Earth Products	—
(Quebec) ...	Castor Oil, &c. Replies to Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C.2.	—
Egypt (Cairo) ...	Glass	240
Mexico	Heavy Chemicals	285
South Africa (Durban)	Chemists' requisites	269
British India	Heavy Chemicals; Pharmaceutical Preparations	266
Palestine ...	Chemicals, Drugs, Oils, Paints, Varnishes, &c.	281
Japan	Chemicals, Dyes, &c.	279
Japan	Chemicals, Dyes, Manures, &c. ...	280
Latin America ...	Chemicals	282

Papers Before the Yorkshire Section

The following Papers were read before the Yorkshire Section of the Society of Chemical Industry at Leeds on Monday.

The Analysis of Lime Liquors

In a Paper on this subject Messrs. Atkin and Palmer mentioned the various constituents of a lime liquor, explained their formation, and gave a detailed account of the method of analysis now usually adopted, which was a development and improvement of Bennetts' previous work on the subject. The determinations included ammonia, sulphides, nitrogen and caustic alkalinity. The last formed a most important item in the control of the liming process, as the swelling of the hide largely depended upon the amount of alkali.

Phenol from Spent Liquors

In a Paper on the "Recovery of Phenol from Spent Liquors," Dr. Dawson showed that the sulphate of soda liquors obtained by "springing" carbolate with oil of vitroil, might contain up to 10 per cent. of phenol, and the object of the investigation was to evolve a process for the recovery of this phenol. The most successful results were obtained by agitating the liquor with about 5 per cent. of cresylic acid and in this way 75 per cent. of the phenol could be recovered.

Government Contracts

The following contracts were placed by the Government during January:—

Ministry of Munitions.

Paint: Brimsdown Lead Co., Brimsdown, Middlesex.
Oils: Vacuum Oil Co., Ltd., Birkenhead.

India Office: Stores Department.

Cement: Associated Portland Cement Mfrs., London, E.C.
Bleaching Powder: United Alkali Co., Liverpool.
Petroleum Jelly: The Silvertown Lubricants, Ltd., London, E.

Crown Agents for the Colonies.

Magnesium Sulphate: Harris, Hart & Co., Manchester.
Oil: The Vacuum Oil Co., Westminster, S.W.
Oil, Linseed: Price's Co., Ltd., Battersea, S.W.
Oil, Boiled Linseed: S. Earle & Co., Ltd., Hull.
Quinine: Howards & Sons, Ilford.

Benn Brothers Journals

Some Features of the Current Issues

The Cabinet Maker.

"Furnishing of the Bush Terminal Building, New York"; "The Grading of Home-grown Timber for Cabinet Trade"; "The Golden Measure or Greek Theory of Proportion"; and "Practical Upholstering of Easy Chairs: the Treatment of Semi-Circular Backs."

The Electrician.

"Calculation of Track Pressure Drop and Track Losses on Direct Current Electric Railways," by F. F. Bisacre (continued); "Direction and Position Finding by Wireless Telegraphy"; and a description of large works of the Chloride Electric Storage Co., at Clifton Junction, near Manchester.

The Fruit-Grower.

"Bird Habits in Relation to Food Production"; "Co-operation according to the A.O.S."; Reports from the Growing and Distributing Centres.

The Gas World.

Special attention is given to several important gas companies, and the post-war financial position of the industry is discussed.

Hardware Trade Journal.

Empire Number: Indian trade development; illustrated articles on the British Industries Fair; "The Film as a Factor in the Development of Overseas Trade," by Arthur Finch; and Japanese competition.

Ways and Means.

"United States War Finance and After" (II.), by Professor Edmond E. Lincoln; "Talks about Work and Wages" (VII.), Money: What it is and How it Works, by the Editor; "Food Prices," by Mr. Boyd Cable; and "Sex Warfare in Industry," by Dr. Lionel Tayler.

Aeronautics.

"Flying as a Sport"; "Rigid Airships and their Development"; "The Aeroplane in Desert Warfare."

SCIENTIFIC BOOKS AND SERIALS

JOHN WHELDON & CO., have the largest stock in the country of Books in all departments of Science (including a large selection on pure and applied Chemistry) and Natural History, also Transactions and Journals of Learned Societies, etc., in sets, runs, and single volumes or numbers.

Libraries or small parcels purchased.

38, Great Queen Street, Kingsway, London, W.C.2.

Telephone: Gerrard 1412.

Does not corrode

QUICK RELIABLE **H · L** CLEAN ECONOMICAL

SOLDERING FLUID

THE LIQUID FLUX

The Strongest and most Efficient Flux on the Market

Send for PRICE LIST to

HENRY LEVIN WEBB & CO.

Chemical Works, Stratford, E. 15.

W. P. THOMPSON, F.C.S., M.I.Mech.E. G. C. DYMOND, M.I.Mech.E.

W. P. THOMPSON & CO. 12, CHURCH STREET, LIVERPOOL.

CHARTERED PATENT AGENTS.

H. E. POTTS, M.Sc.Hon.Chem. J. W. ARMSTRONG, M.T.I

FL. BOURGEOIS,

18/19, Great St. Helen's, LONDON, E.C. 3.

:: :: And at ANTWERP. :: ::

EXPORT AND IMPORT

CHEMICALS

FOR ALL INDUSTRIES.

Telephones: Avenue 4525 3 Lines.

Cables: "Oilfields," London. *Codes:* A B C (5th Edition), Bentley's, Lieber's, Private.

TARIFF.

Agencies.

Businesses—Sale & Wanted.

Machinery, Plant, etc., for Sale.

Miscellaneous —Sales and Wants.

Partnerships. Patents.

Public Appointments.

Road Transport.

Situations Vacant.

1d. per word, minimum 2s.; 3 insertions for price of two.

WANTS
SECTION OF THE
Chemical Age

8. BOUVERIE STREET, LONDON, E.C.4.

Tariff (cond.)

Situations Wanted.

1d. per word, minimum 1/6; 3 insertions for price of two.

Contracts and Tenders.

Legal Notices.

Trade Cards.

Sales by Auction.

4/6 per half inch per insertion. 8/0 per inch per insertion.

MACHINERY, PLANT, &c. FOR SALE.

BLACKSMITH'S Circular BELLOWS and HEARTHS for Sale; Pair 22 in., one Pair 26 in.; two New Cast-iron Hearths, 42 in. sq., with hoods, water bosh and tue iron complete.—J. BOOTH & SON, Engineers, Congleton.

CAMERON DOUBLE PUMP FOR SALE, 6 in. steam, 4 in. water, 6 in. stroke, in new condition, been rebuilt at makers, costing £55, recently; No. 3 Hindley Wall Pattern Donkey Pump, 4 in. steam, 2 in. water; Beaumont rebuilt 3 in. Centrifugal Pump.—J. BOOTH & SON, Congleton, Ches. Telegrams: "Booth, Millwright, Congleton." 'Phone No. 114.

CLAYTON 3-ton Steam Lorry, 1914 model, on rubber tyres; Peerless 4-ton Petrol Lorry, fitted with new fixed platform and driver's cab; Halley 2-ton Petrol Lorry, overhauled and in new condition.—J. BOOTH & SON, Transport Engineers, Congleton. 'Phone No. 114.

DISINTEGRATORS FOR SALE.—Size No. 1½, by Carters & Christy; also a No. 00 Carters, and a 2½ Christy's, all as new. CAKE BREAKING MILL, by Nicholsons, of Newark, with two pairs of rolls, and 16 in. mouth, could be used for reducing lumpy friable Chemicals. BONE CRUSHER, size HH, with Rotary-Screen, by Nicholson. Pair of 30 in., also 42 in., and 48 in. flat running Millstones on wood and iron self-contained frames. Blackstone Mills, fitted with 14 in. Adamas, and 30 in. French Burr Stones. Several pairs of French Burr Millstones, only from 44/54 in. diameter, new thickness. Two heavy Crushing Mills, fitted with chilled rolls, 30 in. by 16 in., placed vertically in frames. One double horizontal chilled iron Roller Mill, 24 in. by 9 in. diameter, by Hopkinson. One Crushing Mill with 17 in. × 12 in. rolls. Centrifugal-Flour-Dressing-Machines 2 and 2½ sheets long, 20 in., 27 in. and 30 in. diameter complete. Several worm-conveyors with and without boxes. Steam Winch with double engines, to lift about 1 ton. New belt-driven-friction-Hoists, to lift 10 cwts. Several Parrafin Oil Engines, from 6 to 25 H.P. Several Gas Engines, from 6 to 18 H.P. Trailer or Heavy Horse Lorry on steel tyres, 4½ in. wide, to carry up to 4 tons as new. Clayton Rubber-tyred Modern 3-ton Steam Lorry, 4-ton Modern Peerless Petrol Lorry, with new platform and cab fitted. Equal to new, 2-ton Halley Petrol Lorry.—For fuller particulars and prices, write to J. BOOTH & SON, General Engineers, Congleton, Cheshire.

FOR SALE.—375 Built Steel Bridge Cross Girders, 15½ ft. long by 1¼ ft. deep, by 8½ in. wide. Suitable for Collieries, &c.—JOHN JACKSON & CO., LTD., Balmoral Street, Scotstoun, Glasgow.

FOR SALE. Three Scott's Copper single effect Evaporating Plants with vacuum pumps and belongings; also two Kestner ditto with belongings. The evaporating capacity of the Scott's is approximately 100 to 200 gallons per hour on gelatine substances.—Details and blue prints, prices, &c., from RICHARD SIZER, LTD., Engineers, Hull.

GRAB FOR SALE.—Immediate delivery. 1¼ yd. capacity.—Full particulars Box 59, CHEMICAL AGE Offices, 8, Bouverie Street, E.C.4.

LARGE "Werner Pfleiderer" Mixing Machine, trough 3 ft. × 2 ft. 9 in., two-geared blade spindles, driven by double friction pulleys 4 ft. dia.; trough is automatically tipped by screw.—WIDDOWSON'S, Canal Street, Nottingham.

LOCO-TYPE BOILERS, 16-H.P., 100 lbs.; 40-H.P., 80 lbs.; also all types.—FREEMAN, Chirkdale Street, Liverpool.

OIL Engines for Sale, 4 H.P. Tangye, 5 H.P. Crossley, 6 H.P. Bates, 6 H.P. Crossley, 7 H.P. Electric Light type Crossley. 12 H.P. Cundall, and a modern 23 B.H.P. Tangye; all overhauled and turned out from here in first-class working order.—J. BOOTH & SON, Congleton, Cheshire. Telegrams: "Booth, Millwright, Congleton." 'Phone No. 114.

STOCKPORT Horizontal Gas Engine, about 6 B.H.P., for Sale, done little work, and in new condition, all complete, in first-class working order; first cheque for £40 secures.—J. BOOTH & SON, Congleton. 'Phone No. 114.

MACHINERY, PLANT, &c., FOR SALE—*continued.*

MACHINE TOOLS FOR SALE.

One new Brown & Sharpe No. 14 Plain Grinding Machine, 12 in. × 30 in.

One No. 3A Warner & Swasey Auto Turret Lathe, all-geared head, as new.

Six No. 9 Herbert Combination Turret Lathes, all-geared head, 3½ in. hole through spindle (without cross-slide), good condition.

One 1¼ in. capacity Foster Turret Lathe, bar feed, cut-off rest, pump, good condition.

Two new Cincinnati Acme Capstan Lathes, 1¼ in. capacity, auto feed to capstan.

Seven new Wells Capstan Lathes, ½ in. capacity, ⅝ in. hollow spindle.

One 1 in. Dreses Capstan Lathe, good condition.

One new Richards type Turret Boring Lathe, admit 32 in. diameter in gap.

One 26 in. swing Darling & Sellers' Boring and Surfacing Lathe, 8 ft. bed, as new.

One 10½ in. × 10 ft. straight bed, S.S.S. and Screw-cutting Lathe by Dean, Smith & Grace, pump, chuck, good condition.

Three new 8½ in. × 8 ft. straight bed, S.S.S. and Sc. Lathe, pump and chuck.

Two 8 in. centre × 6 ft. bed Lang S.S.S. and Sc. Lathes, as new.

One 18½ in. centre × 16 ft. straight bed Lund S.S.S. and Sc. Lathe, as new.

Several 6½ in. × 6 ft. straight bed American Lathes, second-hand.

One 24 in. Bullard Vertical Boring and Turning Mill, with tool holders and side saddle, as new.

One new Ring Grinder, with 8½ in. magnetic chuck.

Two new Universal Tool and Cutter Grinders.

Three Wet Tool Grinders, as new.

Column Drills, Tool Sharpeners, Cutter Grinders, Backing-off Attachments, Chucks, Vices, Hacksaw Blades.

Full Particulars on Application to: THE JUDSON-JACKSON COMPANY, LTD, 50, Marsham Street, Westminster, London, S.W.1.

4 IN. NEW WROT IRON SCREWED AND SOCKETTED PIPING (slightly stock-rusty), 400,000 ft. 6 in., ditto, 90,000 ft. Immediate delivery.—Apply, THOS. W. WARD, LTD., Thames Road, Silvertown, E.16.

35-40 B.H.P. Crossley Suction Gas Plant, overhauled and equal to new; also several Gas Bags, different sizes, in new condition, for Sale cheap, to clear.—J. BOOTH & SON, Congleton. 'Phone No. 114.

MACHINERY, PLANT, &c., WANTED

WANTED.—One good Secondhand Tubular Surface Condenser, cooling surface of 600 sq. ft.—Send lowest price and place of inspection to BRITISH VEGETABLE OIL EXTRACTION CORPN., LTD., Angel Oil Mills, Edmonton, N.18.

CONTRACT WORK.

PATTERN-MAKING.
WE ARE IN A POSITION TO EFFECT QUICK DELIVERIES AT COMPETITIVE FIGURES. Also SMALL FOUNDRY WORK AND MACHINING COMPLETE.
TOOL AND JIG WORK CATERED FOR.
GERRARD ENGINEERING WORKS, Ltd.,
91c, DYNEVOR ROAD, HIGH STREET,
STOKE NEWINGTON, LONDON, N.

A FIRM who are well up in the Grinding and Sifting of all kinds of Dry-Products, with large dry Premises and power on the Canal, would fix up suitable Machinery for the Work, providing they could have constant work guaranteed, and could agree as to terms.—Apply Box Number 60, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

MISCELLANEOUS SALES.

FOR SALE.—About 150 tons BLAST FURNACE PITCH, now in trucks at Goole Docks. Offers wanted. Principals only.—Apply, TOM SHERBURN, Agent, Bank Chambers, Goole.

SUPER-GROUND SILICA FLOUR, of all grades, from 20 mesh to 200 mesh; also "extra fine" and "superfine" (air-flown) Flour Silica, of high quality, perfectly milled, of even texture, and correctly graded; speciality—120-mesh grade, guaranteed to contain not more than 0·5 per cent. residue when passed through Woolley's interwoven silk 120-mesh; general grinding undertaken for the trade.—THE STAR QUARRIES, LTD., Experts in Fine Grinding, 5, St. Werburgh Street, Chester.

MISCELLANEOUS WANTS.

CREOSOTE SALTS WANTED in good quantities anywhere. Samples and prices to FIRELIGHT SUPPLIES, Gorton, Manchester.

CRUDE CARBOLIC Wanted.—BROTHERTON & CO. LTD., City Chambers, Leeds.

PLATINUM, Scrap or Useful. Valuations free. High prices. Prompt cash per return.—W. MUSHAM, Metal Refiner, Arlington Street, Leeds Road, Bradford.

ROLLERS, Hot or Cold, 12×36; heavily geared; Enamelling Ovens, 7 ft. × 7 ft. × 4 ft. 8 in. or 10 in. Surfacing Lathe.—THE EBONESTOS MANUFACTURING CO., LTD., 127, Pomeroy Street, New Cross, London, S.E.14.

SPECTROSCOPES, MICROSCOPES, bought, sold, and exchanged. List free.—JOHN BROWNING, 146, Strand, W.C.

WANTED.—LEAD, remelted in pigs or ingots. Also Lead Ashes, Slags and Skimmings. Prompt cash terms.—SPOONER, SON & CO., 214, Bishopsgate, London, E.C.2. Telephone: London Wall 5959. Telegrams: "Spooneral, London."

WANTED, BICHROMATE OF SODA, 5 tons monthly during this year.—Box S. 476, care of DAWSONS, 121, Cannon Street, E.C.4.

SITUATIONS VACANT.

CHEMIST Required for Small Firm of Aniline Dye Manufacturers, either practical or Research; must be thoroughly efficient and reliable. State experience, full qualification, degrees, if any, age and salary required.—Box No. 56, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

WANTED.—ENERGETIC MANAGER for Paint Works producing Enamels, Coach Colours, Stiff Colours, and Ready Mixed Paints on a large scale. Organising ability and high grade experience necessary. Give full particulars to LEWIS BERGER & SONS, Ltd., Homerton, E.9.

SITUATIONS WANTED.

CHEMIST, with Thorough Experience in Factory Control seeks Position in Manufacturing firm as Assistant Works Manager or Process Superintendent.—Box 55, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

INVESTMENTS.

GERMANY.—Very important heavy chemical factory on the near Rhine is prepared to accept British Capital to the extent of two million marks (to-day less than £7,000) for expansion purposes. The low mark value makes this a most unusual proposition to a foresighted investor.—Fullest investigations, Box 58, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

PATENTS.

PATENTS, INVENTIONS or TRADE MARKS. Advice and handbook free.—Write B. T. KING, Regd. Patent Agent, 165, Queen Victoria Street, E.C.4; or 'Phone Central 268.